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TRANSACTIONS

OF THE

National Dental Association

AT THE

SIXTEENTH ANNUAL MEETING

HELD AT

Washington, D. C., September 10–13, 1912.

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SIXTEENTH ANNUAL MEETING

OF THE

National Dental Association,

HELD AT

WASHINGTON, D. C., SEPTEMBER 1912.

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SIXTEENTH ANNUAL MEETING

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HELD AT

WASHINGTON, D. C., SEPTEMBER 10-13, 1912.

TUESDAY—First General Session.

THE first general session of the sixteenth annual meeting of the National Dental Association was called to order at 10 o'clock Tuesday morning, September 10, 1912, in the ballroom of the New Willard Hotel, Washington, D. C., by the president, Dr. A. R. Mclendy, Knoxville, Tenn.

The President introduced the Rev. Dr. J. HENNING NELMS, Washington, who invoked divine blessing on the deliberations of the association.

The President next introduced Dr. WILLIAM TINDALL, member of the board of Commissioners of Washington, who welcomed the association to the city on behalf of the board of Commissioners, as follows:

Welcome from the Board of Commissioners.

Mr. President, and members of the National Dental Association,—As the representative of the government of the District of Columbia, it gives me pleasure to bid you welcome to the hospitality of the seat of government of the United States, but regret to have to say for the municipal authorities that circumstances over which they have no control prevent them from greeting you in person.

As some of those present may not be familiar with the character of the local government at the national capital, I have to state that it is an autocracy, and that the Congress of the United States is the autocrat.

Near the termination of the Continental Congress which was in session at Philadelphia, the unpaid soldiers of the revolutionary army made a threatening demonstration to that congress, with the object of hastening payment for their services. Bearing this in mind, the convention which prepared the constitution included in that instrument a provision that the future seat of government should be subject to the exclusive legislation and

authority of Congress, such as it exercises over forts, magazines, arsenals, etc. Hence, those who come here to reside and abjure their residence in the states, thus voluntarily surrender all right to participate in the governmental functions of citizens, and retain only the privilege of petition. They may propose, but Congress disposes.

Congress indirectly governs us by a vice-regency, consisting of a board of three Commissioners, two of whom must be our own citizens. These Commissioners are appointed by the President of the United States, and have the power to make police and health regulations and other enactments bearing a general analogy to ordinary municipal ordinances, but none affecting transfers of property or the law of descent, and the like. Our real and personal property is taxed for a fair share of the municipal expenses, but Congress has absolute power to determine how it shall be spent, and exercises that authority. Yet, when all the elements of our municipal problem are considered, there is little real ground for complaint of our treatment by Congress, and much ground for congratulation on its wise consideration of our needs.

Andrew Fletcher, the intractable Scotch genius of Saltoun, stated that he knew a very wise man who believed that if a man were permitted to make all the ballads, he should not care who made the laws. Horace Fletcher, our masticating mentor, advises us that we need not care for the physician if we keep our teeth in good working order, and make diligent use of them. While fools after forty need a physician (if we have any right to live at all after that age), who can do without the dentist? Shakespeare emphasizes the paramount province of dentistry in "Much Ado About Nothing," wherein he affirms—

> For there was never yet philosopher
> That could endure the toothache patiently—

plainly implying that even though a philosopher might risk his professional reputation by having need for a physician, he may still consistently avail himself of the services of the dentist. Of all the consequences of the sins of the fathers which are visited upon the children to the third and fourth generations, such as deafness, hip-joint disease, catarrh, paresis, tuberculosis, and a myriad other forms of carious and vicarious pathological expiation, none is so general as that which affects the teeth. The relation of this latter affliction to our happiness is well illustrated by the response of the boy to a passer-by, who, noticing the depression on the boy's countenance, sympathetically advised him to "Cheer up!—it might be worse," and received the doleful rejoinder, "I guess you never had the toothache."

The art of the sculptor has not produced a more impressive effect than the pathos exhibited in the group entitled the "Laocoon," which portrays a father and his two sons in the toils of two serpents. The account which Virgil gives as the artistic motive for the group ascribes its origin to a commonplace occurrence in connection with the siege of Troy; but a more discerning interpreter of the composition ascribes to it the sublime didactic purpose of depicting a father incurring with his sons the pathogenic consequence of his moral transgression, while he is also subjected to the mental agony of noting the distress he has entailed upon his innocent offspring. In the light of that concept the group

should be enlarged by another figure symbolic of Æsculapius hastening to the relief of the victims, and displaying as a conspicuous feature of his equipment the distinctive implements of dental beneficence. It is the happy opportunity of the dentist not only to alleviate local misery, but to facilitate the harmonious working of the whole bodily economy by keeping in order the machinery essential to that end.

The service rendered to humanity by dental art is incentive to indefinite commendation, but my province today is restricted to the pleasure of extending to you the courtesy of this municipality. It would be superfluous to tell you that the authorities and people of the District of Columbia feel honored and pleased by your selection of the national capital for the deliberations of this session of your association, but the Commissioners are glad to assure you that they welcome you in keeping with that feeling. With your eyes on the endless vista of progress and your feet in the straight and toilsome path of duty, there is no limit to the blessings you may continue to confer, nor to the benediction you will deserve and receive.

Dr. F. O. Hetrick, Ottawa, Kans., responded to the address of welcome on behalf of the association, as follows:

Response to the Address of Welcome.

Mr. President, ladies and gentlemen, and my dear "Mr. Washington,"—Dr. Tindall, will you kindly permit us the familiarity of calling you "Mr. Washington"? You are his representative. Since the day of early beginnings, it has seemed imperative that there be a Mr. Washington, an entity, which represents something tangible; for we have looked upon Washington, the city, as a secondary consideration, and Mr. Washington as the soul of the nation. Some who have been here since last week have been so unsophisticated as to glance into every back yard which they passed, looking for the small boy with his hatchet, and had they found one, I am sure he would have been borne off as a trophy, as well as positive proof that they had actually seen him.

On behalf of the National Dental Association, I want to say how much we appreciate this cordial welcome, these words of kindly greeting, and this assurance that everything within the power of the citizens of this beautiful city will be done for our comfort and happiness. We are going to feel at home, and we are glad that you are willing that we should.

The unique situation of this city stimulates in us a personal interest in its citizenship. All sections of this great country add their quota from the very life of their own citizenship, in the *personnel* of official dignitaries; even the backwoods can furnish a Lincoln for the presidential chair. Therefore the city of Washington holds a personal interest for every citizen of this great nation, as he feels a bit of it belongs to him.

Today we feel as happy as children come home to grandpa's for Christmas dinner. There is not one of us but has one or more personal friends in Washington, friends of other days, friends of our early manhood and womanhood, when closer ties are forged than come to men and women in later years; and so again we are doubly glad to be in Washington and receive this cordial welcome.

We come from every part of our great country: From the West, with its timber, its mines, irrigated lands, and its lengthening shadows; from the middle

West, where the cattle of a thousand hills and ten thousand valleys combine with the hen, the wheat, and other products to make our people rich, so that they no longer are subservient to Wall st.; from the sunny South, with its courteous gentlemen and gentlewomen, its timber, its cotton fields, its minerals, and its memories; from the North, with its tremendous industries of mining, timber, and agriculture, and from the East, with its great cities, its manufactories, its shipping, its dignity, and its traditions. Thus we come from all sections, representing many ideas, yet as a representative body of one profession, we bring with us but one ideal, the motto of which is—"Progressive achievement."

Our ideas are as varied as the sections we represent. I understand that here in this city you worship Mr. Precedent almost as much as we worship Mr. Washington; yet with us, Mr. Precedent does not amount to a second thought, because it is Fact we seek.

Now, seeing you are so glad that we did come, we are going to let you into a secret or two. Before we do that, I want to say that we have some very wise and very profound gentlemen here, almost as profound as the old darky preacher—in telling this story I want to say that it is an old one, for Dr. E. C. Kirk told it at a banquet last night and I have had it typewritten for some time; but it illustrates the point I wish to make. The old darky preacher arose and after announcing his text ("Dem dat has shall git mo', but dem dat has nuffing shall have whut dey got done took away") raised his right hand and said: "Brederen, dis text contains de hidden mysteries of de infinitestimal, and it is hard to subjunctuate, but I's here to explain the unexplainable, to lucinate your hallucinations, and to unscrew the inscrutable." We have men here who can do all this—aye, e'en more. Why, we have a few men here who have openly admitted that they are going to revise our constitution. Some of them have been at it now for ten years, and they have gotten as far as—"Whereas, believing the constitution of the National Dental Association needs revising—we are the lads to do it!" We have brought them down here to Washington in this constitutionally legislative atmosphere—of our Washington, if you please—to see if Mr. Washington cannot help them get it through, at least before the inauguration of the next republican president.

But why haste? Great men are not generally creatures of a passing moment, nor is a great measure the thought of an hour, but the result of long and vigorous training, sometimes merely the evolution of public sentiment. Things worth while do not happen quickly. This young nation, less than five hundred years ago, was but a band of sturdy pioneers, who braved the terrors of an unknown sea that they might plant the principles of liberty in this soil of ours. Gaining a foothold in the new country, they began at once sending other pioneers into the trackless forests. These men in turn with their families were surrounded by new dangers of cold, hunger, wild beasts, and hostile Indians. They were thrown back for a time, but not for long; that kind of people will not be denied. Thus was the conquest of our land attained. The spirit of those sturdy pioneers has lived again in the hearts of the pioneer in dentistry. We too are confronted by trackless forests and unbounded prairies to subjugate. The spirit of conquest is likewise afire in us, and we shall not be satisfied until we

can say of many unsolved problems, *Now we know!*

When the thirteen colonies consolidated that they might stand together as a unit against the common enemy, they selected Washington as their seat of government. They came by primitive methods of transportation. Today we come thundering over the same country, in limited trains at from thirty to sixty miles an hour, over the same land they traveled with their ox-teams at from fourteen to twenty miles a day. We come by auto and all other methods of rapid transit, even by the balloon—that is, if Dr. L. E. Custer has arrived. The problems we have to solve here are many; we even have personal enmities to eliminate. We dentists are younger than the nation, but we meet each year with the same undaunted courage and purpose that, as a profession, we shall be able to announce a forward step over the year preceding. We are seeking a happiness that comes with attainment, such a happiness as Edison feels in his sixteen hours of hard labor daily performed in his laboratory, or Jane Addams at Hull House, amid the strenuous cares of her civic conquests.

Our pioneer investigators were happy only when working out the secrets that held the destiny of the dental profession in their grasp, and were satisfied only when, like Wordsworth's "Happy Warrior," they could say:

> Who, not content that former work stands fast,
> Looks forward, persevering to the last;
> From well to better, daily self-surpast.

So again let me say we are glad of the opportunity to meet in this city of traditions, high courtesy, and splendid achievement. It is most fitting that in such a place we re-pledge and renew our faith in "Progressive achievement." [Applause.]

The next order of business was the Address of the President. Dr. L. L. Barber, Toledo, Ohio, vice-president from the East, occupied the chair while the president, Dr. A. R. Melendy, read his annual address. [See page 45.]

Dr. Barber. I want to take this opportunity to congratulate the members of the National Association upon their privilege of hearing so concise and clear-cut an address from our president.

If there be no objection, I shall appoint the following committee to report on the President's address: Dr. James Truman, Dr. F. L. Platt, and Dr. H. W. Morgan.

Dr. Melendy resumed the chair.

Dr. Burton Lee Thorpe. Mr. President, ladies and gentlemen,—I have a very pleasant duty to perform in introducing to you the distinguished dentist of Madrid, Spain, Dr. Luis Subirana, who is professor of orthodontia in the Central University of Madrid, and who is the author of a treatise on Orthodontia, and also a history of Horace Wells, the discoverer of anesthesia. I move you, sir, that he be accorded the privileges of the floor. [Applause.]

Dr. Subirana addressed the association in Spanish, and his address was interpreted by Dr. A. G. Weber of Havana, Cuba.

Dr. Subirana spoke as follows:

Sr. Presidente, Señoras, Señores,—Siento mucho que el desconocimiento del idioma inglés no me permita expresar en la forma cumplida que deseo la presentación hecha por el Dr. Lee Thorpe, y, muy en particular, la especial predilec-

ción que personal y profesionalmente siento por el pueblo americano.

Personalmente, porque desde muy joven y durante largos años de trabajo al lado de un dentista americano de gran relieve en Madrid, el Dr. Highlands, bajo cuya influencia no solo adquirí gran hábito de trabajo y de disciplina, sino que de él aprendí y con su ejemplo me infundió estricta conciencia en el trabajo repudiando lo mediano y puesta la vista siempre en lo mejor: Y profesionalmente, como dentista, quién no siente una gran admiración hacia el pueblo que fundó la primera escuela, imprimió la primera revista y constituyó la primera sociedad? Pero además de su preponderancia en el pasado, en el presente, de esta América no vienen los más importantes libros dentales, los más sensacionales inventos mecánicos y los más perfeccionados instrumentos que usamos en nuestra práctica; pero además de todo ésto, quién no dirige de nosotros los dentistas europeos la mirada con gratitud y admiración á este pueblo que fué cuna de nuestro infortunado Horacio Wells? A este gran dentista americano he dedicado grandes esfuerzos mios, no solamente escribiendo la historia de su descubrimiento, sino que hice pintar un cuadro de su vida ya muy conocido, y recabé de la Sociedad Odontológica Española que por suscripción le enviara una corona, que está en el cementerio de Hartford, y hemos tenido la satisfacción, los dentistas españoles, de ver cómo después de nuestro homenaje los dentistas de París le levantaban un monumento.

Como profesor de ortodoncia de la Universidad de Madrid he venido exclusivamente á este país para recojer lo último de esta especialidad y llevarla á Madrid como semilla para que fructifique, pero al saber que se celebraba este Congreso, he querido venir á saludar á los amigos que aquí tengo.

Señor Presidente [taking the president's hand]: Un modesto miembro de la dentistería de la tradicional España, aunque sin representación especial de la Sociedad Dental de Madrid, en nombre de ella os estrecha la mano para que trasladeis su afecto al joven pueblo americano dental, ejemplo de laboriosidad y progreso.

[Translation.]

Mr. President, ladies and gentlemen,—I regret that my lack of acquaintance with the English language prevents me from expressing myself in a manner befitting the introduction by Dr. Burton Lee Thorpe, and the special predilection which I have for the American people personally and professionally; personally, because in my youth I acquired the habit of work and discipline from Dr. Highlands, an American dentist of high repute in Madrid, with whom I spent many years, and whose influence and example inspired me in the highest degree with the duty of striving always rather for the greatest accomplishments than for things of less importance. Professionally, as a dentist who cannot but feel admiration for the people who founded the first dental school, printed the first dental journal, and organized the first dental society. Besides their prestige in the profession of dentistry in the past, it is to Americans that we owe at present the leading books in dental science, the most startling mechanical inventions, as well as the most perfect instruments that we use in our practice. Considering all this, is there one among all the European dentists who does not look with gratitude and admiration upon this nation, the native land of the unfortunate Horace

Wells? To the memory of this great American dentist I have devoted a great deal of my energies, writing the history of his discovery, delineating a picture of his life, already known to many, and obtaining a subscription from the Spanish Dental Society for a wreath, which has been deposited in Hartford cemetery. We, the Spanish dentists, after our simple homage, have had the satisfaction of seeing the Parisian dentists raise a monument in his memory.

As professor of orthodontia in the University of Madrid, I came to this country solely for the purpose of gathering the best and latest in this branch of dentistry, that I might take it with me to Madrid as a seed which is destined to bear fruit. As soon as I learned that you were going to hold this meeting here, I decided to come and greet my friends.

Mr. President [taking the president's hand], a humble member of the dental profession of historic Spain, though not officially delegated from the Dental Society of Madrid, shakes hands with you as the representative of that society, and begs to extend the affectionate greetings of the Spanish *confrères* to the American profession—our example of industry and progress.

The next order of business was the report of the Executive Council by the chairman, Dr. Burkhart, as follows:

The Council reports the daily program according to the printed slips that have been distributed.

The exercises for the morning, in addition to what we have already had, will be a paper by Dr. Newell S. Jenkins, Dresden, Germany, read by Dr. A. J. Cottrell of Knoxville, Tenn., also a short paper by Dr. M. C. Smith of Lynn, Mass.

This afternoon Section I will meet in this room. At 4.30 this afternoon, there will be a meeting of the Committee on Reorganization in the small parlor, and the chairman of the committee requests me to ask every member who is interested in this important subject to be present at that time, so that those who have views to express on that subject may express them at that time, and not take up the time of the general session when the reorganization plan is reported back to the association.

This evening at 8 P. M., Section II will hold a meeting in this room. At 10 P.M., in the "red room" of the hotel, a reception will be given by representatives of the Panama Pacific Dental Congress, which will be held in San Francisco in 1915. The committee requests that all the members and guests of the association be present, as souvenirs in the shape of wines and fruits will be given out at that time.

I am requested by Dr. V. E. Turner to announce that a business meeting of the Southern Branch of the National Association will be held in the small parlor at 5 o'clock on Wednesday afternoon.

I may say that the paper by Dr. Stewart on "Materia Medica" will be the second paper to be read this evening in Section II.

The sessions tomorrow will be as follows: Section III will meet in this room at 9 o'clock, the General Session at 12 o'clock, at which time a paper will be read by Dr. M. L. Rhein. Section I will meet at two o'clock in this room tomorrow; at 8 o'clock tomorrow night Dr. Harvey W. Wiley will deliver an address, which will be followed by one by Dr. G. E. Hunt.

I have been requested by the Council to make the following recommendation: That members of state societies who have

joined the National Association as such societies, and whose dues have been paid, be received as members for this session of this association.

Mr. President, I move the adoption of the report.

Motion was seconded and carried to adopt the report.

The PRESIDENT. The next item on the program will be a paper by Dr. N. S. JENKINS, Dresden, Germany, entitled "Modern Dentistry in Germany," read by Dr. A. J. Cottrell, Knoxville, Tenn. [See page 52.]

The next order of business as announced by the President was the reading of a paper by Dr. M. C. SMITH, Lynn, Mass., entitled "What the Government is Doing to Prevent Diseases." [See page 59.]

The President then declared the general session adjourned until Wednesday at 12 o'clock.

WEDNESDAY—Second Session.

The general session was called to order at 12 o'clock Wednesday morning, September 11, 1912, by the president, Dr. Melendy.

Dr. H. J. BURKHART. I have the honor of presenting to you the representative of the Surgeon-general of the United States Army, Dr. E. P. Tignor.

Dr. TIGNOR addressed the association as follows:

Mr. President and gentlemen,—It gives me very great pleasure to be here as a representative of the Army Dental Corps, because it affords me the opportunity not alone to see many of the best men of the profession, but also to say a word about the dental corps and its influence. As you probably know, the army dental corps was recognized about eighteen months ago, giving to us commissioned rank. Since that time we have attempted to increase the corps according to the provisions of Congress—which gives us a corps of ninety, instead of thirty, as we had in the past, but unfortunately we have been able to secure only ten or twelve men. This is not due to any lack of applications, because a great many practitioners have applied, nor to undue difficulty of the examinations, which have only been sufficiently thorough to secure men who would be a credit to the profession; but I think it is due rather to the fact that a great many of the best men do not know that such openings exist and what this career means for the young man. While I am here, it would afford me very great pleasure to talk to any of you personally and give you as much information on the subject as possible, and I ask your aid in filling up the corps with men who will be a credit to our profession.

The next order of business was the report of the Executive Council, by Dr. H. J. BURKHART, chairman, as follows:

The printed program, which you all probably have, is the program that will

be followed today. The program for tomorrow will be a meeting of Section II, to be held at 9 A.M. in this room. The general session will be held at 12 o'clock, at which time Dr. L. F. Kebler will read his paper, and the selection of time and place of our next meeting, and the election of officers, will take place. Section I will meet in this room at 2 o'clock, Section II at 8 o'clock. The detailed program will be distributed tomorrow morning.

There will be a meeting of the Executive Council this afternoon, at which a resolution on patents, offered by Dr. Emory A. Bryant, will be considered.

Tomorrow morning at 9 o'clock there will be a meeting of the Council. I am requested to announce that there will be a meeting of the Journal Committee in room No. 743 at 2 o'clock this afternoon. Immediately following the adoption of this report, Dr. Platt will address the association in regard to the Panama Pacific Dental Congress to be held in San Francisco in 1915.

I move you, Mr. President, that the report be adopted. [Motion carried.]

Dr. MELENDY. I now have the pleasure of presenting to you Dr. F. L. Platt of San Francisco, who will address you in regard to the Panama Pacific Dental Congress.

Dr. PLATT spoke at length in regard to the proposed Panama Pacific Dental Congress, and invited the National Association to hold its annual meeting in San Francisco in 1915 in conjunction with the Dental Congress to be held at that time—the week beginning with the last Monday in August 1915.

Dr. H. J. BURKHART asked unanimous consent for the acceptance of this invitation, and that it be arranged to have only a business session that year. He made a motion to that effect, which was seconded by Dr. Truman W. Brophy, and was unanimously carried.

The next order of business for the general session was the reading of a paper by Dr. M. L. RHEIN, New York, N. Y., entitled "Mouth Infections." [See page 69.]

The general session then adjourned until Thursday at 12 o'clock.

THURSDAY—Third Session.

The general session was called to order by the president, Dr. A. R. Melendy, Knoxville, Tenn., on Thursday at 12 o'clock noon, September 12, 1912.

The first order of business was the report of the Executive Council, viz:

Dr. BURKHART. The program for today will be as announced on the printed sheets which you have. The clinics will be held in this room, and in the small parlors tomorrow morning. There will be a general session at 12 o'clock tomorrow in this room. A request has come to us from the members of the International Dental Federation with reference to the invitation to that association to hold its meeting in this country next year. They request that this association carry forward that invitation—that is,

that they be invited to meet in this country in 1915 at the time of the Panama Pacific Dental Congress. If there is no objection, the secretary will be directed to so notify the officers of the F. D. I.

The Council also reports a resolution for your approval to the effect that the present delegates to the International Dental Federation, or rather the Sixth International Dental Congress, which convenes in London in 1914, be empowered to make all necessary arrangements with reference to securing papers and the transaction of any business that may be necessary with reference to the dental profession in this country, and to take charge of the interests of the National Dental Association for that congress.

The report of the Committee on Revision of the Constitution has been referred by the Council under the rules to this body, and will come up for consideration at 1.30 this afternoon.

The Council approves of the resolution which has been offered with reference to the Chapin A. Harris Memorial Fund. This fund is for the purpose of providing for a monument to be erected in honor of Dr. Harris in Baltimore, and all members of the profession are requested to contribute as liberally as possible to that fund.

The following resolution has been considered by the Council, and referred back to this body for adoption:

RESOLVED, That it shall be considered unprofessional for a member of this association to obtain a patent upon any art of treating human disease or ailment or disability, or upon any device adapted to be used in the treatment of human disease or disability, or attached to the human body and used as a substitute for any lost part thereof, or upon any art of making such device, unless such device is adapted to be put on the market and sold.

I move the adoption of the report. [Motion carried.]

The next order of business, as announced in the daily program, was the reading of a paper by L. F. KEBLER, M.D., Washington, D. C., entitled "Preparations for the Toilet of the Mouth and Teeth." [See page 91.]

Dr. M. F. FINLEY. I move you, Mr. President, that we extend to Dr. Kebler a rising vote of thanks for his valuable and interesting communication to our association. [Motion carried.]

Dr. BURKHART. I have the pleasure of introducing to you a distinguished member of the dental profession of Europe and the treasurer of the International Dental Federation, Dr. Florestan Aguilar of Madrid, Spain.

Dr. AGUILAR spoke as follows:

Mr. President, ladies and gentlemen, —I shall not encroach upon your precious time, but I wish to thank you for the courteous invitation extended to me. It gives me great pleasure to come as the official representative of the International Dental Federation to answer the kind invitation from your association to have our next meeting in the United States. We have requested that the invitation be carried forward, and we shall be most pleased to join with you in 1915 in San Francisco, Cal. [Applause.]

I have also the most pleasant task of delivering to Professor Black of Chicago the W. D. Miller medal, which has been awarded to him by the International Dental Federation. [Applause.]

It must be a source of pride to you gentlemen and to the members of the American dental profession at large to see that one of your colleagues has been

honored with this medal, which comes from the dental profession of all the nations of the world as a token of admiration of the work done by that member of the American dental profession.

I have also been empowered with the diplomatic charge of inviting you to come to London to the International Dental Congress which will be held there in 1914. We hope that America, always foremost in work for the advancement of dentistry of the world, will not fail to be represented there in large numbers, and with a large contribution to the literary work of the congress. [Applause.]

Election of Officers.

The next order of business was the election of officers and the selection of the time and place of the next meeting.

Dr. H. V. Brockett, Kansas City, presented an invitation to the association to meet in Kansas City in 1913.

Dr. B. Holly Smith moved that the rules be suspended, and that the secretary be instructed to cast one ballot of the association for Kansas City as the place of meeting for 1913. [Motion carried.]

Dr. McMillan moved that the time be set for the first Tuesday after the fourth of July. [Motion carried.]

The election of officers for the ensuing year resulted as follows:

President—F. O. Hetrick, Ottawa, Kans.

Vice-president for the West—T. B. Hartzell, Minneapolis, Minn.

Vice-president for the East—V. H. Jackson, New York, N. Y.

Vice-president for the South—J. H. London, Washington, D. C.

Corresponding Secretary—C. W. Rodgers, Boston, Mass.

Recording Secretary—H. C. Brown, Columbus, Ohio.

Treasurer—H. B. McFadden, Philadelphia, Pa.

Executive Committee—C. M. Work, V. H. Jackson, and W. G. Mason.

Executive Council—H. J. Burkhart, Charles McManus, T. P. Hinman, B. Holly Smith, and E. R. Warner.

REPORT OF COMMITTEE ON PRESIDENT'S ADDRESS.

Dr. Jas. Truman, chairman, then presented the report of the Committee on the President's Address, as follows:

The committee to whom was referred the President's address has given it careful consideration.

The recommendation in regard to the raising of a fund to aid aged dentists has our entire sympathy, and we would suggest that the committee selected by the president devise a method by which the state associations can be brought in harmony with the subject.

The suggestion that a committee be appointed consisting of three members, whose duty it shall be to present to the proper parties the just claims of our profession to a proportion of the benefactions of the world, meets with our warmest approval, but it does not seem feasible or desirable at this time. The existence of the Forsyth Dental Infirmary is a more eloquent appeal to those who are able to contribute to the amelioration of human suffering than the efforts of any committee. Much can be done by making known the generosity of the Forsyth brothers.

Your committee recognizes the value of the results of the scientific work being done by the government, reports of all of which are obtainable through its various bureaus, but does not think it wise to undertake a work, through this association, that the government is able to do in a much more efficient manner.

The act of Congress of August 22, 1912, giving rank and precedence to the dental corps in the same manner in all respects as in the case of appointees in the medical corps of the navy, is of such importance that it merits special notice, for, by this act, the government of the United States has set its stamp upon the character of dental work and its important relations to the healing art.

To the self-sacrificing character of Dr. Wms. Donnally's work, through fourteen years of unceasing effort, is due this success, and your committee heartily indorses all that the president said upon this subject.

The suggestion that the association should render the Legislative Committee such financial assistance in the prosecution of their work as may be required, meets with our cordial approbation, and we hope that this may be arranged as requested by the president.

JAMES TRUMAN, *Chairman*,
FRANK L. PLATT,
HENRY W. MORGAN, *Committee*.

Dr. MELENDY. If there is no objection, we will consider that this report is adopted.

Dr. JAS. TRUMAN, Philadelphia, Pa. Mr. President, I wish to offer the following preamble and resolutions for the consideration of this association:

Whereas, the report of the Army and Navy Legislation Committee having been presented, and the satisfactory results fully outlined therein, it is deemed appropriate that this should receive special notice from this National body responsible for this work from the beginning; and

Whereas, this report marks an era in dentistry, inasmuch as it shows that the government of the United States has placed its stamp of recognition on our profession, regarding it as a recognized branch of the healing art, and as a specialty equal in its achievements to that of other specialties of medicine; therefore be it

RESOLVED, That in view of the fact that dentistry has been given a place in both army and navy, through the efforts of this and previous committees, that this, the National Dental Association, representing the entire United States, tender to these its grateful thanks and appreciation of their labor and its results; and be it

RESOLVED, That it is recognized by this body that the success attending this prolonged effort, through fourteen years, is mainly due to Dr. Wms. Donnally of Washington, and this has been fully recognized by this committee and past committees in charge of this responsible duty; therefore be it

RESOLVED, That inasmuch as this has not been accomplished except through large money outlay and sacrifice of time, resulting in serious loss and some financial embarrassment, in the past, to Dr. Wms. Donnally, the Executive Council be requested to take this into consideration and devise a plan to reimburse the said Dr. Wms. Donnally for the lavish sacrifice of his private means, and that the said council report the result of its conclusions to a future sitting of this body during its present session.

Dr. TRUMAN. Mr. Chairman, I move the adoption of the resolutions as read. [Motion carried.]

REPORT OF THE REVISION COMMITTEE.

The next order of business was the report of the Revision Committee, consisting of the "Constitution and By-laws of the National Dental Association" [as printed in the Appendix.]

Dr. J. D. PATTERSON. I move that the report of the Revision Committee as coming from the Council be adopted. [Motion carried.]

The Report of the Committee on Scientific Research was then read by Dr. HENRY C. FERRIS, New York, N. Y. [See page 96.]

The general session then adjourned until Friday noon.

FRIDAY—Fourth Session.

The general session was called to order on Friday at 12 o'clock noon, by the president, Dr. Melendy.

The first order of business was the report of the Executive Council, by the chairman, Dr. Burkhart, as follows:

Dr. Burkhart. I am directed by the Executive Council to offer the following resolution for adoption:

Resolved, That at the 1913 session of the National Dental Association and on the third day thereof, the first house of Delegates shall convene for a single session for the election of officers, the appointment of committees, and such other business as may be necessary for placing the new constitution in operation, and the same members composing the house of Delegates shall serve as the house of Delegates at the session for 1914, and their terms of office shall begin thereat.

Motion was made and carried that the resolution be adopted.

A resolution recommended by the Council indorsing a proposed amendment to the pharmacy laws of the District of Columbia [see page 37] was on motion adopted.

The next order of business was the installation of the newly elected officers for the ensuing year.

Dr. Burkhart. I have been directed by the Council to offer a vote of thanks to the retiring president, Dr. Melendy, for his very earnest, efficient, and splendid service as president of this association.

Motion was made and carried that a vote of thanks be extended to Dr. Melendy for his efforts in making the present meeting a success.

Dr. Burkhart. I move that the secretary be directed to say to the proprietors of the Willard Hotel that never in its history has this association been so well and so satisfactorily cared for. They have done everything for the comfort and convenience of those in attendance at this convention, and they are entitled to a hearty vote of thanks for their efforts in our behalf. I also wish to include in the resolution a vote of thanks to the Local Committee of Arrangements in this city for their most efficient and hard work, and for the splendid arrangements which they have made for this meeting.

The motion was carried.

Dr. Burkhart. I also move that, in case of an emergency or any extraordinary event, the Executive Council be empowered to transact such business for the association as may be necessary, and that they be given power to change the time of the next meeting, if necessary. [Motion carried.]

Dr. Burkhart. I move that a hearty vote of thanks be also extended to the chairman and members of the Clinic Committee for their hard and efficient work in giving us one of the most successful clinics in the history of the association. [Motion carried.]

Motion was then made and carried that the association adjourn until the next annual meeting.

Homer C. Brown,
Recording Secretary.

MINUTES

OF THE

EXECUTIVE COUNCIL.

MONDAY—September 9, 1912.

WASHINGTON, D. C.

THE Executive Council met in the committee room at the New Willard Hotel at 2.15 P.M., being called to order by Dr. H. J. Burkhart, chairman, with Drs. Arthur R. Melendy, B. Holly Smith, Eugene R. Warner, and Homer C. Brown present.

An invitation was read from the president of the Panama-Pacific International Exposition, followed by remarks by Dr. Frank L. Platt, San Francisco, Cal., who gave information relative to the Exposition and outlined the plan for a Panama-Pacific Dental Congress, requesting permission to present the matter before the association. On motion by Dr. B. Holly Smith the request was granted.

Dr. ARTHUR M. FLOOD, San Francisco, Cal., expressed a desire to distribute some souvenirs and to have members visit the headquarters of the Panama-Pacific Dental Congress representatives. On motion these courtesies were accepted and the time set for 10 P.M. Tuesday.

On motion the Council adjourned.

TUESDAY—September 10th.

The Council was called to order at 9 A.M. by Dr. H. J. Burkhart, chairman, with Drs. Melendy, Smith, Warner, McManus, and Brown present.

Dr. J. D. PATTERSON addressed the Council relative to members of the Maryland Dental Society having paid dues into their state society with the understanding that the reorganization was to become effective this year.

After some discussion it was on motion recommended that members of such state societies as have voted to become components of the National, and whose dues have been accordingly increased and collected, be accorded the privilege of membership at this session of the association.

The resignation of Dr. Richard Summa as a member of the Educational Council was presented and on motion accepted. On motion Dr. Frank L. Platt, of San Francisco, Cal., was appointed to fill the vacancy.

A letter from Dr. Williams (M.D.), Washington, D. C., relative to some publicity work, was on motion referred to

Dr. C. B. Warner, chairman of the Publicity Committee.

On motion Council adjourned until 3 P.M.

September 10th, 3 P. M.

The Council was called to order by Dr. H. J. Burkhart, chairman, with Drs. Warner, McManus, and Brown present.

Dr. C. B. Warner, chairman of the Publicity Committee, presented the following report:

REPORT OF THE PUBLICITY COMMITTEE.

To the Officers and Members of the National Dental Association.

Gentlemen,—Since the last annual meeting of the National Dental Association there have been published in the press throughout the United States over 76,800 half-column articles on the care of the teeth. These articles have appeared in practically every state in the Union, and in some foreign countries as well. This represents six months' work—for we delayed our campaign after the first of March on account of the coming presidential election. While the newspapers are crowded with speeches other news is not in demand; after the election, conditions will become normal and we can proceed with the work.

The committee report progress in our method of handling the business. As in all pioneer work, we had to work out our plan as we progressed, but at this stage we are operating by a system that enables us to handle all orders quickly and accurately. We have changed our contract which we make with the local dentist, whereby each man pays for exactly the cost of operating in his locality. This we find better than having a common fee, as was our former contract.

At the first meeting of this committee it was decided to assume charge of the publicity campaign inaugurated by the Illinois State Dental Society, and to refund to that society any money that had been spent in promoting this enterprise, provided that such refund be made out of any profit that might accrue to this committee in its work. We were thus enabled to take up the work exactly where that society left off, and had the benefit of their labor and experience.

In the matter of newspaper publicity we have barely made a beginning, so large is the field, yet we feel encouraged with the results of our first year. As our work becomes better known and better organized, we should show an increase each year. The work also is continuous, for if we conduct a campaign in a certain locality, and then direct our activities in other sections, in the course of three or four years we can return to our former field for a second campaign.

This committee has encouraged the publication of dental articles in various popular magazines. By recommendation, it is possible to influence editors along this line. Especially have we been fortunate with the various woman's journals and farm journals. We wish at this time to express to this association our appreciation of the courtesy extended to us by these editors.

We are urging upon manufacturers of proprietary dental articles the value of accurate instruction in the care of the teeth, and that the circulars accompanying their wares should also recommend public dental inspection. This the manufacturers seem willing to do, and some in addition make mention of the value of dental inspection in their advertisements in the magazines, which has given that movement a very wide publicity.

In our correspondence with local dentists in various parts of the country, complaints have been made that this committee did not handle literature intended for local publicity, such as booklets, charts, etc. These, as now handled by private parties, are often unreliable. As this committee is in constant correspondence along publicity lines with dentists from all parts of the country, this work could be taken in conjunction with our other work with little additional cost or labor.

We are advised by some of our newspaper friends to change the name of this committee. The term "Publicity" does not appeal to the newspaper man very strongly, inasmuch as publicity agents in the commercial world are his constant worry. It has been suggested

that this committee be called "The Public Dental Education Committee," as being more dignified, and we therefore recommend that the name be changed.

Respectfully submitted,

C. B. WARNER, *Chairman*,
B. HOLLY SMITH,
CHAS. S. BUTLER.

On motion the report was received, ordered printed in the Transactions, and its recommendations adopted.

Dr. HOMER C. BROWN, chairman of the Publication Committee and of the State and Local Society Committee, presented the following reports:

REPORT OF THE PUBLICATION COMMITTEE.

TO THE OFFICERS AND MEMBERS OF THE NATIONAL DENTAL ASSOCIATION.

The 1911 Transactions should have reached all our members some weeks ago, and is practically the report of our committee. However, through some error the report of the Oral Hygiene Committee to the Executive Council was not incorporated in this. The only possible excuse that can seemingly account for this is the fact that the chairman of our committee condensed the financial report of this committee, inasmuch as it was a long one and contained a number of penciled changes and corrections. This condensed portion of the report was mailed to the chairman of the Oral Hygiene Committee with a request to promptly review same and return with his approval or such changes as were necessary. After waiting long enough to have this report returned, the reports of the various committees, and all other copy, was forwarded to the publishers. An explanation was made of the above and publishers advised that if any change was necessary that it would be promptly submitted after copy was returned. The publishers may have withdrawn this particular report expecting further instructions, but through some oversight the condensed report was not returned, although the chairman made at least three requests for same.

A notice appears on page 244 of the Transactions which will explain the reason for one paper not appearing in the volume.

Respectfully submitted,

HOMER C. BROWN, *Chairman*,
CHAS. W. CUTHBERTSON,
W. I. JONES.

REPORT OF THE STATE AND LOCAL SOCIETY COMMITTEE.

Your Committee on State and Local Society beg to report that our work for the year has been largely in conjunction with the Reorganization Committee. When possible we endeavored to arrange for some member of our committee to assume the initiative when the reorganization question came up before the various state societies for consideration, and in this manner assist the Reorganization Committee.

Respectfully submitted,

HOMER C. BROWN, *Chairman*.

On motion both reports were received and ordered printed in the Transactions.

The Chairman of the Publication Committee explained the absence of the Oral Hygiene Committee's report in the 1911 Transactions, and moved that the report be published in the 1912 Transactions, which was carried. [See page 21.]

The Secretary read letters from Drs. L. G. Noel and W. T. Chambers, members of the Relief Fund Committee. Also, he presented the report of the chairman, Dr. L. G. NOEL, as follows:

REPORT OF COMMITTEE ON NATIONAL RELIEF FUND.

Your committee took up the work early in the year with the view of getting the plan before all the state societies in time to bring the question to a vote at the annual meetings.

In this effort the only state society to which we failed to present our plan, as far as we know, was the Ohio society, which holds its meetings early in the year, and which we hope to reach next year. Your committee divided its work as follows: Dr.

Gaylord undertook the New England states and New York. Dr. Chambers undertook to present the work to the states west of the Mississippi, and your chairman endeavored to have it presented to the remaining northern, middle, and southern states.

Dr. Gaylord visited many of the societies in his division during their annual meetings, presenting our plan in person. On account of the desire of many leading men to see the reorganization movement through first, and on account of the opposition freely expressed to any increase in the annual dues in state societies, Dr. Gaylord deemed it unwise to press our relief cause this year. Therefore he made a tentative presentation of our plan, hoping to secure favorable action at some future time when the reorganization shall have been effected.

Your chairman was unable to personally attend all the societies in his division, and therefore sought to accomplish the work by selecting influential men to present the plan, advocate, and then defend it. These advocates, in many instances, had to be selected without knowledge of their views or sympathies on the subject, and hence these selections in many cases may not have been the best. We encountered much opposition to the increase of annual dues, and fearing to obstruct the reorganization movement, our advocates were constrained to use the "soft pedal," with very negative results. Firmly believing that it would be best for all concerned, and the shortest road to the attainment of our desires, your chairman advocated the adoption of both movements at the same time (*i.e.* the reorganization and the relief fund plans), and so advised in all the literature he sent out. He has not been brought to a change of views on this subject, and since these questions are yet to come before many state societies for final decision, he would still urge that they be decided at the same annual meeting, so that, in case of a favorable action upon both, provision may be made for both at once in the revision of constitutions that must necessarily follow.

On account of the difficulties above set forth, the results of the first year's work of your committee have been somewhat disappointing, but we are undismayed and hopeful for the future.

Thus far the only states that have voted the adoption of our plan are Colorado and Tennessee. Several state societies have passed commendatory resolutions, and some have pledged themselves for the future. We have reports from Kentucky, Virginia, Illinois, Missouri, Alabama, and Florida, that lead us to hope these societies will adopt our plan with the reorganization plan at their next annual meetings. A few individuals have volunteered to give annual contributions of from five to ten dollars per year. We think this feature should be given more encouragement and publicity, with a view to enlarging its usefulness. We doubt not it could be made a valuable adjunct. Several of these volunteers have begged that their names be kept out of the journals in this connection. This, we think, is ill-advised modesty. A good deed that may influence others to emulation should generally be held up as an example, and is far more potent than mere persuasion. The number of these voluntary contributors is seven; but thus far only two individuals have actually sent in their contributions.

Your committee will get busy with the collection of these contributions during the coming autumn, and with soliciting others.

Since the publication of Dr. James McManus's paper, which was read before the National Dental Association at Birmingham, Ala., in which he set forth the idea of establishing a home for retired dentists, quite a degree of interest has been manifested in the home feature, and we have had some inquiry about it. Some express a willingness to contribute to the home, who would not subscribe to the relief fund. Dr. Fred Westerfeld, of Klamath Falls, Ore., has not only contributed five dollars to the general fund, but offers to contribute one hundred dollars to the founding of a home. Being unable to promise the home until more money is in sight, and not then until directed by the vote of our donors to put it to such use, we have accepted Dr. Westerfeld's generous offer to place this sum in escrow. The publication of Dr. Story's paper in *Items of Interest*, advocating the founding of a home, seems to have given added interest to this feature. If this becomes a popular idea with the profession, Dr. Westerfeld has set a worthy

example, and similar contributions will very soon get together a sufficient sum for the purpose.

Your committee is humiliated to report so little progress as the result of one year of effort, but hopes to make a better showing next year.

Respectfully submitted,

E. S. Gaylord,
W. T. Chambers,
L. G. Noel, *Chairman.*

SUPPLEMENTAL REPORT BY DR. CHAMBERS.

On 1st of February, the circular letter explaining the objects of the Relief Fund, and the method of creating it, was mailed to the secretary of each state dental society west of the Mississippi. An effort was then made to secure the name and address of the president of each state society. Quite a complete list was obtained by March 9th, at which time a duplicate of the circular letter, as well as a personal letter, was mailed to the presidents. This was done as a precautionary measure, as mail is frequently miscarried. The latter part of July another letter was sent each secretary, requesting that he notify me what action was taken by his state society. Fifteen replies have been received, which in substance are as follows: One reports that it indorses the Relief Fund suggested by the Committee of National Dental Association, as a voluntary but not as a compulsory measure for the relief of aged and infirm dentists. One voted against the proposition. One appointed a committee to investigate the matter more thoroughly. One referred the matter to its executive council with no definite action. One failed to receive the circular letter. Two have postponed their meetings till October, at which time they will consider the relief fund. Seven societies decided to lay the matter on the table without taking any action. Wyoming has no state society. The Colorado State Dental Society, at its meeting in June, voted to increase its dues, one dollar a year, according to the plan suggested. This money will be available immediately after the 1913 meeting. Undoubtedly, the majority of dentists are in favor of creating the fund, but the method of compulsory assessment is evidently the objectionable feature of the proposed plan. An effort to accomplish it by individual subscription is certainly worthy of trial, and would soon determine the possibility of such a fund becoming a reality.

W. T. Chambers.

On motion these reports were received, ordered printed, and the committee continued.

Dr. W. G. Ebersole, chairman of the Oral Hygiene Committee, presented the following report:

REPORT OF THE ORAL HYGIENE COMMITTEE.

To the Honorable Members of the Executive Council.

First: The Oral Hygiene Committee respectfully requests that permission be granted for the distribution of programs and literature calling attention to the Union Mouth Hygiene Meeting to be held on Friday.

Second: That permission also be granted to place two young ladies on the 10th floor to receive charter membership to the National Mouth Hygiene Asssociation.

Third: That permission be granted the committee to call attention to the Fifteenth International Congress on Hygiene and Demography, and solicit the co-operation of the profession in making a success of the Dental Exhibit in this connection.

Respectfully submitted,

W. G. Ebersole,
J. V. Conzett.

This was discussed by Drs. W. G. Ebersole, J. D. Towner, E. R. Warner, H. C. Brown, L. L. Zarbaugh, and H. L. Wheeler. Chairman Burkhart stated that if there were no objections the report would be received and printed in the Transactions and the request of the committee granted. It was so ordered.

(The Oral Hygiene report for 1911 [ordered printed with these Transactions, see page 18] here follows.)

THE 1911 REPORT OF THE ORAL HYGIENE COMMITTEE.

To the Executive Council, N. D. A.

Gentlemen,—Your committee begs leave to submit the following report:

We wish to announce to your honorable body that the success of our publicity campaign as instituted last year has been most gratifying. The result of its influence upon the various forces interested in Oral Hygiene has been most remarkable. The interest manifested by governments, national, state and municipal, far exceed the fondest hopes of the most sanguine members of your committee.

The deep interest which has been manifested by the educational forces of the country has been one of the most encouraging features in connection with the work.

Much of the interest which has been manifested from all sources has been brought about by the publication and distribution of preliminary reports, relative to this work, from time to time.

The success of our campaign is the more remarkable because of the fact that up to the present time only preliminary reports of the experimental work, which we have been conducting for the purpose of proving the value of healthy oral conditions, have been published.

We believe that the members of this body are fully aware of the tremendous amount of interest that is being manifested in Oral Hygiene throughout the country by all kinds of organizations and individuals, and this has been brought about through the publicity policies adopted by your committee.

We are aware that a number of your members feel that some of the members of the committee have been over-enthusiastic in their claims and statements relative to the importance the mouth and teeth bear to the health and welfare of mankind.

Your committee has also been informed that some of your members feel that the statement that "dentistry would stand on a par with the best of medicine, not only in the mind of the public, but in rank and recognition by governments," was unwise and exaggerated.

Your committee wishes to say to you, gentlemen, at this time, that the record which it has secured from its scientific experiments and which will be announced for the first time at the Oral Hygiene meeting, Wednesday evening, is such that it not only justifies every statement made in this connection, but shows results which, when supported by similiar tests, will force upon the public and upon the governments of this country such recognition as we have predicted.

With regard to the future, your committee asks that you recommend to the National Association that the Oral Hygiene Committee, subject to the approval of your Council, be permitted to appoint an auxiliary committee composed of at least five men from each state and territory in the Union, which committee shall co-operate with the National Committee in spreading the Oral Hygiene propaganda.

We further ask that you indorse to the National Association the recommendation of your committee that the Oral Hygiene working forces of this country, in so far as possible, be combined under one general head; and have them so organized and their methods so executed that every ounce of energy put forth will bring full value in return.

Your committee earnestly requests that you indorse to the association its recommendation relative to the formation of an organization which will permit the co-operation of all forces interested in the spreading of the Oral Hygiene propaganda, whether they be professional or lay, individual or organization, whose constitution and by-laws shall be so drafted that the organization becomes an auxiliary of the National Dental Association and shall operate under the direct control of the said association's Oral Hygiene Committee.

Such an organization should be composed of and officered by people representing every walk in life; and such an organization must be formed if the most good is to be accomplished by the dissemination of knowledge and data furnished by the profession.

Your committee feels that the National Association is the proper organization to take action in this matter; and so strong has been the feeling of your committee in this connection that it has issued a call for a conference, as follows:

"The Oral Hygiene Committee of the National Dental Association hereby extend to you an invitation to attend and participate in a conference of the Oral Hygiene men of

this country to be held in the Engineer's Building, Cleveland, Ohio, Friday, July 28th, 1911, at 8 P.M. This conference is called for the purpose of discussing suitable ways and means of handling the Oral Hygiene problem in the most effective and economic manner."

From the financial standpoint, your committee begs to submit the attached bill, together with itemized statements of all money received and expended, to which is attached the receipted bills.

Your committee recommends that the balance of the one thousand dollars which was appropriated (provided it was in the treasury and not needed for other purposes), be turned over to the committee to be used in publishing and distributing reports relating to the work which has been accomplished during the past year.

Respectfully submitted,

W. G. EBERSOLE, *Chairman*,
RICHARD GRADY,
J. P. CORLEY,
B. HOLLY SMITH,
W. A. WHITE,
E. P. DAMERON, *Committee.*

SPECIAL ORAL HYGIENE FUND.

Receipts.

H. C. Brown	$10.00
E. R. Warner	10.00
H. J. Burkhart	10.00
A. R. Melendy	10.00
Chas. W. Rodgers	10.00
C. L. Alexander	10.00
B. Holly Smith	10.00
J. G. Sharp	10.00
W. E. Boardman	10.00
E. S. Gaylord	10.00
W. G. Ebersole	10.00
A. H. Peck	10.00
Southern Branch, N. D. A.	120.00
Ohio State Dental Society	100.00
Nebraska State Dental Society	25.00
Pennsylvania State Dental Society	25.00
New York Odontological Society	10.00
From blanks we had printed:	
Dr. J. E. Chace, Ocala, Fla.	2.00
N. J. State Village for Epileptics	18.00
Mr. C. A. R. Stone, Ritzville, Wash.	2.00
Dr. V. E. Turner, Raleigh, N. C.	8.00
H. J. Ray, Aiken, S. C.	2.20
B. Holly Smith, Baltimore, Md.	4.00
Moose Jaw, Saskatchewan	2.00
	$438.20

Disbursements.

Stenogr., Jan. 21—May 27, 1911	$261.00
Sundry exp., Jan. 21—July 28, 1911	165.80
Balance on hand	11.40
	$438.20

*Paid from funds contributed by Dental Manufacturers' Club, in 1909-10:	
Stenogr., Aug. 7, '10—Jan. 14, '11	$330.00
Office supplies, ditto	3.95
	$333.95

Amounts due members of the committee.

Dr. W. G. Ebersole:	
Stenogr., June 3—July 29, 1911 ($130.00), and sundry exp., Aug. 30—July 29, 1911 ($90.40)	$220.40
Dr. J. P. Corley:	
Exp. connected with Oral Hygiene Exhibits	96.00
Dr. H. C. Thompson:	
Exp. attending Com. meet'g, Buffalo.	25.00
	$341.40

RECAPITULATION.

Receipts.

From the dental profession	$120.00
" state and local societies	280.00
" sale of blanks	38.20
" Dental Mfg. Club	333.95
Due Drs. Ebersole, Corley and Thompson	341.40
	$1113.55

Disbursements.

From fund rec'd from dental profession and state and local soc.	$426.80
From funds remaining from contribution by Dental Mfg. Club—which is refundable	333.95
Paid by Dr. Ebersole, Corley and Thompson	341.40
Balance in profession and soc. fund	11.40
	$1113.55

(A complete itemized statement of expenses was attached to the report, here condensed for publication.—H. C. B.)

On motion adjourned.

*Paid from this fund with a view of refunding it, to be used in distribution of reprints of the final results of the work at the end of the year.

WEDNESDAY—September 11th.

The Executive Council was called to order at 9.45 A.M. by Dr. Burkhart, chairman, with Drs. Melendy, McManus, Warner, Smith, and Brown present.

Dr. EMORY A. BRYANT, chairman of the Patent Committee presented the following report:

REPORT OF THE COMMITTEE ON PATENT LEGISLATION.

The chairman of the Committee on Patent Legislation begs leave to report as follows:

Following the appointment of your committee, and in accordance with a resolution passed at the Cleveland meeting, identical bills were introduced in Congress—Senate 5177 by Senator Henry Cabot Lodge of Mass., and H. R. 20,591 by the Hon. E. Y. Webb of North Carolina. The gist of these bills is contained in the following paragraph:

"But no patent shall be granted upon any art of treating human disease, or ailment, or disability, or upon any device adapted to be used in the treatment of human disease, or disability, or attached to the human body and used as a substitute for any lost part thereof, or upon any art of making such device, unless such device is adapted to be put on the market and sold."

Your chairman requested a hearing from both the House and Senate committees on Patents, which was given in the case of the former, and action delayed to some future time by the latter.

The hearing before the House committee was satisfactory and gives promise of results, no report being made at this session of Congress on account of lack of a quorum, only one of the many bills designed to amend the patent laws—that of the chairman of the House Committee on Patents—that were introduced at this session being favorably reported.

At no session of the House Committee on Patents in the last several years have so many bills been considered, and so many hearings held, as has been the case during the present session.

The whole patent system is under investigation by Congress, and the near future will bring forth many changes and corrections of the present system, and your chairman feels confident that if proper steps are taken by this association, and sufficient energy be exerted by its committee, and by the members of the association and allied societies, that Congress will adopt such a measure as will forever relieve the dental profession from being exploited by patentees holding patents of the description referred to by the bills now before Congress.

Your chairman would recommend, as a preliminary to any future action being taken, that a standing resolution be passed by the Council and the general body, prohibiting its members from applying for patents of the description sought to be prohibited, and making it specifically an unprofessional offense for them to so do.

That devices and processes or methods of treatment of a meritorious description may be protected from being patented by others, and honors rightly earned may be properly and satisfactorily bestowed upon members of the profession for inventions, etc., your chairman has made arrangements with the Commissioner of Patents whereby drawings and specifications of any improvement or invention in the science and art of dentistry may be sent to the Patent Office, placed in their files for reference and citation, and a certificate for the same will be given therefor by the Commissioner of Patents.

This certificate would show the date of invention, and be *prima facie* evidence to the association and the members of the profession as to the original inventor, whereby any honors might be claimed by or be bestowed upon the rightful parties interested.

As a further preventive, it is recommended that all publishers of dental journals and of literature relating to dentistry be requested to send one copy of the publication to the Patent Office, for its reference library.

Your chairman is confident, if these three propositions are consistently followed out and in active force, that even without the amendments proposed being adopted by Congress, the dental profession would be well protected for the future, although it would be preferable to have the amendments adopted if it be possible to do so.

Your chairman desires to specially thank

Dr. Richard Summa of St. Louis, Mo., Dr. Jules J. Sarrazin of New Orleans, La., Dr. H. F. Hoffman of Denver, Col., Dr. J. E. Duffield of Camden, N. J., and the associations in the states of Louisiana, Missouri, Mississippi, Arkansas, Colorado, Maryland, and the S. A. M. of New Jersey, for their efficient support in this legislative work.

Your chairman recommends that a resolution of thanks be given to Hon. Edwin Y. Webb of North Carolina and Hon. Henry Cabot Lodge of Massachusetts for their services for the betterment and progress of dentistry.

Your chairman desires to thank the other two members of his committee, Drs. C. R. E. Koch and C. N. Johnson for their hearty cooperation so far as it was possible for them, considering that both members lived so far from the seat of action and that they are in the far West when this report is made up and submitted.

Respectfully,

EMORY A. BRYANT.

On motion the report was received and ordered printed.

Dr. BRYANT also presented the following resolution:

RESOLVED, That it shall be considered unprofessional for a member of this association to obtain a patent upon any art of treating human disease or ailment or disability, or upon any device adapted to be used in the treatment of human disease or disability or attached to the human body and used as a substitute for any lost part thereof, or upon any art of making such device, unless such device is adapted to be put on the market and sold.

On motion this resolution was referred to the general session for consideration. [See page 12.]

Dr. RICHARD GRADY presented the following resolution:

RESOLVED, That a special committee of five (of which one member shall be identified with the army and one with the navy) be appointed by the President to collate and report to this association at its next annual session the facts respecting the origin and history of U. S. army and navy dental legislation.

After some discussion, and on motion, this was referred to the History Committee.

Dr. JOSEPH HEAD addressed Council with reference to the paper read by him before the Cleveland meeting, which was not published in the 1911 Transactions; also, his paper as listed in this year's program. This question was discussed by Drs. Joseph Head, H. C. Brown, H. J. Burkhart, B. Holly Smith, Chas. S. Butler, and others. Dr. Warner offered the following resolution:

RESOLVED, That the Executive Council of the National Dental Association send to the Secretary of the Department of Agriculture the paper entitled "The Necessity for Dental Education on the Subject of Mouth Antiseptics," read by Dr. Joseph Head before the meeting at Cleveland, 1911, with all the data relating thereto, asking for a report.

On motion the resolution was adopted.

On motion the Executive Council expressed its approval of the officers and the Publication Committee in withdrawing Dr. Head's paper from the 1911 Transactions.

Dr. M. F. FINLEY, chairman of the Pharmacopeial Committee, presented the following report:

REPORT OF THE PHARMACOPEIAL COMMITTEE.

TO THE OFFICERS AND MEMBERS OF THE NATIONAL DENTAL ASSOCIATION.

Your Committee on Pharmacopeia present for their report this year an address by Dr. L. F. Kebler, chief of Drug division, Bureau of Chemistry, United States Department of Agriculture, and ask that Dr. Kebler be assigned time, at one of the general sessions, for presentation of his subject, "Oral Dental Preparations."

We herewith submit the correspondence which resulted in securing Dr. Kebler for this occasion, and desire to acknowledge the hearty co-operation of the Secretary of Agriculture and the great service he has rendered this association in assigning the chief of the Drug division, Bureau of Chemistry, to this work of testing dentifrices and mouth-washes, upon request by this association in resolutions adopted at Denver in 1910.

We suggest that a letter be sent by this association to the Secretary of Agriculture expressing appreciation of his co-operation and service performed in undertaking the tests necessary for the presentation by Dr. Kebler of his address on "Oral Dental Preparations."

Respectfully submitted,

M. F. FINLEY, *Chairman*,
JOSEPH HEAD.

WASHINGTON, D. C., July 5, 1912.

Dr. L. F. KEBLER, Bureau of Chemistry, Department of Agriculture.

Dear Dr. Kebler,—Some little time ago, in conversation at a meeting in Grant school, you intimated that your bureau might possibly have enough tests completed so that a report might be made, at the meeting of the National Dental Association on September 10th next, as to the findings regarding tooth-powders, pastes, and washes.

If such be the case—that a report can be made and you would be at liberty to make such a report to our association—I shall be much pleased if you will accept this invitation from me to do this, and if you will indicate the designation you would like to have the report appear under, I will see that your name appears on our programs, and also the title of the report as you wish it, and will have a time set by the Program Committee for you to present the same. I spoke to Dr. Head regarding this matter, and he was equally pleased with myself that you had tentatively consented to make this report.

I hope I have not delayed too long in presenting this formal request to you. Hoping to have a favorable reply, I am, with kindest regards,

Sincerely yours,

M. F. FINLEY, *Chairman*,
Committee on Pharmacopeia.

WASHINGTON, D. C., July 18, 1912.

Dr. M. F. FINLEY, 1928 I St., N. W., Washington, D. C.

Dear Sir,—Your favor of July 5th at hand, and in reply beg to state that I have been authorized to address the National Dental Association at the meeting in this city next September on a subject dealing with our work, of interest to the dental profession. I prefer to have the subject rather general than specific. I would suggest the title "Oral Dental Preparations."

Respectfully,

L. F. KEBLER, *Chief, Drug Div.*

CORRESPONDENCE WITH THE SECRETARY OF AGRICULTURE.

COLUMBUS, OHIO, October 22, 1912.

Hon. JAMES WILSON, Secretary of Agriculture, Washington, D. C.

Sir,—I was directed by our association to officially express our appreciation of your co-operation in assigning Dr. L. F. Kebler, chief of the Drug division, Bureau of Chemistry, to the work of analyzing dentifrices and mouth-washes, upon the request of this association in accordance with a resolution adopted at Denver, 1910. Also, for the able address presented by Dr. Kebler on "Oral Dental Preparations," at our meeting held in Washington, September 10th to 13th. We trust that this relation may continue, and that your department and our Pharmacopeial Committee, through Dr. M. F. Finley as chairman, may find much interest in common, which will work to the benefit of our citizenship.

In addition to this the following resolution was passed at our recent meeeting:

"RESOLVED, That the Executive Council of the National Dental Association send to the Secretary of the Department of Agriculture the paper entitled "The Necessity for Dental Education on the Subject of Mouth Antiseptics," read by Dr. Joseph Head before the meeting at Cleveland, 1911, with all the data relating thereto, asking for a report."

In accordance with this resolution I am herewith inclosing Dr. Head's paper, with the explanation that the points in question are the statements made by the essayist in connection with "Calox," and beg to assure you

that our association will feel deeply indebted to you and your department if you can give us an official report thereon.

Again thanking you for your co-operation, I remain

Very respectfully yours,

HOMER C. BROWN, *Recording Sec'y.*

DEP'T OF AGRICULTURE—OFFICE OF SEC'Y,
WASHINGTON, D. C., November 4, 1912.

DR. HOMER C. BROWN, Rec. Sec'y, N. D. A.

Dear Sir,—Receipt is acknowledged of your letter of October 22d, forwarding a copy of a paper by Dr. Joseph Head, entitled "The Necessity for Dental Education on the Subject of Mouth Antiseptics," in regard to which you state that your association would like to have an official report from the Department of Agriculture.

In reply, I beg to advise you that the Department of Agriculture cannot undertake to furnish an official opinion on a paper read at a meeting of an association, and I am constrained to decline your request.

Very respectfully,

M. M. HAYES, *Acting Sec'y.*

As Secretary of the Educational Council, Dr. HENRY L. BANZHAF, presented the following report:

Second Annual Report of the Secretary of the Dental Educational Council of America.

By HENRY L. BANZHAF, B.S., D.D.S.

SINCE the presentation of the first annual report submitted at Cleveland last year, your secretary has devoted considerable time securing information respecting the dental educational situation of this country, collecting data and practicing administrative economy, hoping thereby to provide the necessary funds for future needs. You will remember that on account of lack of time the Council last year was unable to consider the secretary's report in detail, and that at its last meeting, held July 27, 1911, it was decided that the next meeting should be held in January, just preceding the meeting of the Institute of Dental Pedagogics, and that the recommendations of the secretary made in his annual report should come up for consideration and action at that time.

In accordance with these instructions a meeting of the Council was called for January 22, 1912, in Chicago. Six members responded to the call by their presence, as follows:

Representing the National Association of Dental Faculties. J. D. PATTERSON, H. E. FRIESELL, GEO. E. HUNT, HENRY L. BANZHAF.

Representing the National Association of Dental Examiners. CHAS. P. PRUYN.

Representing the National Dental Association. J. V. CONZETT.

There was no quorum present. At first blush one might possibly conclude that lack of interest prevented a majority from attending this meeting, but it should be borne in mind that the members of this organization live in widely separated sections of the country, and that this may have been a factor in their minds to excuse them. Those present, however, discussed the recommendations already referred to informally. The majority appeared to be of the opinion that the standard set and the means suggested for its enforcement were too complicated, and that much which had been offered lacked practical value. The stumbling-block seemed to be the words "equivalent education" in the consideration of proper entrance requirement for the admission of students to colleges. Your secretary does not feel called upon to offer another formal set of recommendations at this time, believing that this body had better take the initiative in this matter. For, if the subject is determinedly taken up by this body, its deliberations will ultimately bear fruit, and materially assist in raising the standard of dental education in America.

In this connection, however, I beg to offer a few simple suggestions. To this end, I shall briefly discuss with you the following points:

I. The present dental education situation. From the best information obtainable, it appears that there are 56 dental colleges in the United States. These can be divided into three groups:

Colleges members of the N. A. D. F.	39
Colleges members of the Universities Association	6
Colleges belonging to no association	11
Total	56

Assuming that colleges belonging to the first two named associations are properly supervised, there still remain eleven schools regarding whose conduct we have no information outside of the report of the chairman of the *Ad Interim* Committee of the National Association of Dental Faculties and the report of the Joint Tabulating Committee, neither of which possesses accurate information regarding the administrative policy followed by these schools.

In regard to this latter feature more information should be gathered by this Council before any action is suggested. We must not lose sight of the fact that while this body can act only in an advisory capacity, it can give accurate information regarding the conduct of all dental colleges, for it is in a position to secure the necessary information for the asking. It is, of course, true that the work of this body along this particular line has not been progressing very rapidly during the past year. This, however, should not be regarded as necessarily a discouraging feature. The Council has undertaken a large work; moreover, it had no funds, and it meets practically but once a year.

II. What the Council should consider and act upon at this meeting:

(*a*) It should agree on what it regards as a proper standard of admission to colleges.

That this is a problem which requires the most careful consideration no one will deny. In the first place, must we not face the fact that this body has no power to enforce any standard that may be agreed upon, except as such enforcement may be made possible by co-operation with the boards of dental examiners in the different states? In the next place, it seems to me that the time has arrived when this Council should speak in no uncertain terms respecting the kind of entrance requirements to be demanded for the admission of students to dental colleges.

If the restrictions, safeguards, and reforms which I had the honor to submit to you last year, and which were offered in view of the conditions which were found to exist in some sections of this country, appear to be too cumbersome, the simplest remedy is to do away with "equivalents" altogether. Under such a rule, colleges would admit students without conditions on a basis of fourteen units of high-school credits, or credits from schools of the rank of high schools, allowing two or three or possibly four conditions, these to be removed before graduation by genuine examinations. This would effectually eliminate the possibility of preliminary dental examiners admitting students to dental colleges who have never attended any school above the eighth grade, by passing "fake" entrance examinations. Each component part of this Council must take a *bona fide,* uncompromising stand against dishonest examinations. otherwise we can hope for no true and lasting betterment of dental education and the standing of our profession.

(*b*) A uniform curriculum of study to be suggested, with rules governing the advancing of students in classes.

Relative to this subject I herewith submit a digest of the report of the Committee on Curriculum, prepared by the chairman, Dr. H. E. Friesell. He says:

"I have made a canvass of the catalogues of all the dental colleges of this country and Canada, and find that the main subjects of the dental curriculum are treated quite uniformly in practically all of the colleges. The following less important subjects have been taken up by a fair proportion of the colleges and should be taught by all of them, namely, Radiography, Comparative Dental Anatomy, Oral Hygiene, Physical Diagnosis, Dental Jurisprudence, Ethics and Dental Economics. It seems that the dental curriculum of today is fairly uniform in our colleges. Undoubtedly a greater uniformity in the methods of presenting and teaching the various subjects would result in a higher standard of work, but our committee is not prepared to offer such suggestions at this time. Our committee would call attention to the excellent efforts being made by the Institute of Dental Pedagogics looking toward the preparation of text-books written especially for dental teachers and students, also the work that has been done by the Committee on Uniformity of State Board Examinations of the National Association of Dental Examiners. It would seem to your Committee on Curriculum that the following are matters of very great importance to dental education, namely:

"1. The need of text-books written especially for dental students.

"2. An entrance curriculum specifying certain required subjects and properly evaluating elective subjects.

"3. A dental curriculum more definitely specifying the scope of the teaching required in all subjects."

These suggestions are timely, and it is to be earnestly hoped that the Committee on Curriculum for 1913 will continue its studies of this important part of the work of our Council.

(c) A study of the existing dental laws in the United States, with a view of offering suggestions which shall provide better and wiser protection to the people.

Respecting this phase of our work, Dr. J. V. Conzett, chairman of the Committee on Legislation, submits the following report:

"Your committee is of the opinion that a recommendation should be submitted to the general bodies advising that an effort be made to have a national examining board appointed, and examination before whom and a certificate attesting the passing of such examination to be *prima facie* evidence that the candidate is competent to practice in any state in the Union, and such certificate to be recognized by all state boards. Of course the necessary legislation to effect such a condition must be passed by the different states, but if the effort is not made to unify along some line, it will never be done, and your committee believes this will be the simplest and best way to accomplish the result."

The value and pressing importance of making a study of existing dental laws cannot be exaggerated. Its timeliness has been impressed upon your secretary by two meetings which took place in Milwaukee during the month of August just passed—one, of the Commissioners on Uniform State Laws, the other, of the American Bar Association, with its section on Legal Education. The whole aim and effort of these two organizations is to formulate and secure uniformity of legislation in social, industrial, and legal educational matters. They represent a great concerted and irresistible movement going on in the legal profession toward betterment and growing strength through the mighty forces of uniform law and practice. We of the dental profession are inspired, somewhat, by the same ideals, but are we actuated by the same determined enthusiasm that results in cooperative action and effectual achievement? We should, it seems to me, in conjunction with the National Dental Association, the National Association of Dental Examiners, the National Association of Dental Faculties, and, if need be, with the advice and assistance of the Commissioners of Uniform State Laws, resolve upon some determined action with a view to secure that strength of unity which will put our profession in the forefront of the great movement for social service.

In offering these suggestions I submit that the motive is found in the desire merely to suggest the subjects to be discussed by this Council for such action as may be thought best.

One of the principal difficulties we have had to contend with thus far is the fact that on account of the many different organizations which meet at this time, it is not easy to hold to our program and secure action. In order to overcome this obstacle, I would suggest that as soon as possible during this meeting the various committees organize and decide upon a plan of action, and that the reports of these committees be made to the Council in six months, at such time and place as may seem to be convenient. This work, in my opinion, should now be pursued vigorously. Mere criticisms of existing conditions should now cease, and promises to raise our standards in dental education should be held in abeyance until action can be taken after further honest and intelligent inquiry has been made.

III. The attitude of the parent bodies toward this Council:

(a) The National Association of Dental Faculties.

To this association belongs the credit of having made the first effort to properly supervise the work of American dental colleges. During the years of its existence there has always been growth—an upward movement toward a higher standard. There have, of course, been reactionary periods, as there are in the history of every organization. The onward movement should not stop until all unwise practices whch may have been found to exist and which tend to commercialize dental education are eliminated. All schools must

set themselves the same goal, to be reached in the quickest time and in the best way possible.

The National Association of Dental Faculties has loyally supported this Council by giving it financial support, and thus it has demonstrated that it wishes to help this Council make a full and fair study of existing conditions. The funds for doing a good year's work are now at hand, and it is to be hoped will be wisely made use of.

(b) The National Association of Dental Examiners.

This association is the keystone upon which alone a permanent superstructure can be built. Its members represent the will of the people as expressed in the laws which are written upon the statute books of our various commonwealths. The state dental boards demand qualifications of all applicants in behalf of the health of all the people, rich and poor alike. Its position in this Council is one of rare opportunity. I do not know what the policy of this association respecting this Council will be in the future, but I desire to leave this thought uppermost in the minds of the members of this association, namely, that when the Council on Dental Education takes final action relative to the subject of classifying dental schools, the National Association of Dental Examiners exert its moral influence with its own members in behalf of the necessary co-operation on the part of individual state dental boards for higher standards in dental education.

In this connection it occurs to me that if the National Association of Dental Examiners, the only body which has a legal standing, wishes to do constructive work—work which shall help dentistry, help dental education, and directly help the people—it should see to it that a progressive, active committee of workers be sent to represent the National Association of Dental Examiners in the Dental Educational Council of America, with instructions to act.

The sincerity of the desire of the National Association of Dental Examiners to co-operate effectively in the future educational work of this Council is on trial, and the Dental Examiners should see to it that no unholy educational alliance between individual colleges and individual state dental boards to the detriment of dentistry shall be permitted to gain a foothold in this country.

(c) The National Dental Association.

Perhaps a mistake was made in the manner in which the Educational Council was organized. Possibly it should be controlled by the one body which has for its membership men belonging to all the organizations known to dentistry. However this may be, it seems to me that another year should elapse before any attempt should be made to change this organization. It seems fair, now that funds with which to pursue this work are at hand, to give the Council on Dental Education an opportunity to prove its usefulness in its sphere of activities. If the result is negative, a new Council should be formed by the National Dental Association and be controlled by it. The function of a dental college is to prepare men to assist in the great health movement which was begun by this body. Naturally, therefore, the National Dental Association is most vitally interested in the kind of men who seek to enter the dental ranks. In view of present conditions, I would therefore respectfully suggest that the National Dental Association send to this Council a committee of its strongest and best men, with power and will to act. This suggestion applies with equal force to the three bodies now represented on the Educational Council.

The cry today is for social justice, for a larger social service. In this regard the dental profession has a duty to fulfil, a task to perform, and an ideal to reach. We are not mere breadwinners, we are not mere seekers after wealth and fame, we are not isolated factors in the marvelously complicated social life of the nation. We are, and we must realize that we are, co-operative in the great social movement for higher and saner thinking, for healthier and cleaner living, for more just and honorable acting. There is a broad and strong spirit of social altruism entering into all the professional ranks, which we cannot if we would, and which we may not if we could, fail to recognize and welcome. This Council must take cognizance of the growing light, by wise and determined and fearlessly honest action in regard to the bettering of dental education in its academic, legal, and professional aspects. There must

be a generous and broadminded co-operation between the National Association of Dental Faculties and the National Association of Dental Examiners under the inspiring and assuring guidance of the National Dental Association.

The all-inclusive national body, with its wealth of experience, and wisdom, and dignity, and strength, will encourage the schools in their aspiration toward higher things, will support the state boards in their endeavor to protect the public and the profession, and will unite all in an effort to give the nation the best and most generous service within the power of the profession.

On motion the report was received and ordered printed.

On motion, Dr. L. L. Barber, Toledo, Ohio, was appointed to take the place of Dr. Howard E. Roberts, Philadelphia, Pa., as a member of the Educational Council.

On motion adjourned.

September 11th, 3.30 P.M.

The Council met at 3.30 P.M. and was called to order by Dr. Burkhart, with Drs. Warner, Melendy, and McManus present; Drs. Smith and Brown were attending a reorganization conference.

Dr. FOSTER, Baltimore, Md., addressed Council with reference to establishing a Harris memorial at Baltimore, and requested that a resolution be passed indorsing the proposition, and that it be placed before the profession in order that contributions to this end could be secured.

On motion the Council approved the proposition and recommended that it be presented to the general session.

The resolution which Dr. Emory A. Bryant had presented, with reference to patents, was taken up for consideration. No objections being offered, the Council recommended that it be presented to the general session and that it be adopted.

Dr. HERBERT L. WHEELER, chairman of the Journal Committee, presented the committee's report, as follows:

REPORT OF COMMITTEE ON DENTAL JOURNAL.

TO THE NATIONAL DENTAL ASSOCIATION.

The Journal Committee desires to report that the Journal fund has reached about $1400.

This is not considered a sufficient sum to warrant the continuous publishing of a journal until the adoption of a reorganization plan.

We therefore report progress, and recommend the continuation of the committee for another year.

Respectfully submitted,
HERBERT L. WHEELER, *Chairman*,
BURTON LEE THORPE, *Sec'y*,
FRANK L. TAYLOR.

The recommendations were approved and the report ordered printed in the Transactions.

On motion adjourned.

THURSDAY—September 12th.

The Executive Council was called to order at 9.15 A.M. by Dr. Burkhart, chairman, with Drs. Melendy, McManus, Warner, Smith, and Brown present.

Dr. JAMES TRUMAN presented the report of the Committee on President's Address, and on motion it was arranged that he present it before Thursday's general session, following the election of officers. [See page 13.]

Dr. Truman also requested permission to read a resolution which he had prepared, before the general session. On

motion his request was granted. [See page 14.]

Dr. TRUMAN W. BROPHY addressed the Council with reference to the Miller Memorial Committee, and recommended that the committee be continued.

Dr. Brophy later furnished the secretary with his written report, as follows:

INTERNATIONAL MILLER MEMORIAL

January 7, 1913.

TO THE EXECUTIVE COUNCIL, N. D. A.

Gentlemen,—As chairman of the International Miller Memorial Committee, and in the absence of Dr. Wm. Carr and Dr. Holly Smith from the meeting in Stockholm, I submit the following report:

In the report as delegate to the meeting of the F. D. I. in Stockholm, a complete statement has been forwarded to you by myself, in which the receipts, investments, and disbursements of the funds are reported in detail. It is sufficient to state, therefore, in this report of your committee, that no further subscriptions have been made to the fund since my report as chairman made at the annual meeting in 1911, which report was presented in my absence by Dr. Smith of this committee.

It is the desire of your committee to secure further subscriptions to the amount of about $1000 which will make up for the United States a subscription of $5000 to this fund, an amount which we believe will be subscribed by members of the profession in cities and states which have not yet made contributions.

In view of the fact that this is a living memorial which we believe will be perpetuated through the centuries, and the object of which is to manifest an appreciation of scientific attainments, a high degree of skill, and great services in the interest of suffering humanity, we feel sure that members of the profession in America will, with their usual liberality and interest in professional advancement, round out this fund to the full amount requested.

Respectfully submitted,

TRUMAN W. BROPHY, *Chairman.*

On motion the report was received and committee continued.

Dr. FLORESTAN AGUILAR, Madrid, Spain, addressed the Council with reference to the F. D. I. meetings, and stated that he was in the country to honor one of our co-workers, by presenting to Dr. G. V. Black the Miller medal, which had been unanimously awarded him.

The Secretary read a letter from Dr. Wilbur F. Litch, chairman of the Necrology Committee. Dr. Litch was unable to be present, and sent the following report:

REPORT OF THE COMMITTEE ON NECROLOGY.

TO THE EXECUTIVE COUNCIL, N. D. A.

Your Committee on Necrology report that since the annual meeting of 1911, six members of the National Dental Association have been removed by death, namely, Dr. James Edward Power, Dr. Samuel A. Freeman, Dr. Safford Goodwin Perry, Dr. Louis D. Archinard, Dr. Auville Leroy Whitney, Dr. J. A. Hall and Dr. Chas. S. Stockton.

The following biographical sketches have been copied from obituaries published in the *Dental Cosmos, Items of Interest* and *Dental Brief:*

Dr. Jas. Edward Power.

JAMES EDWARD POWER was born in Woonsocket, R. I., on February 14, 1879. His death from tuberculosis occurred June 12, 1911. He received his early education in the schools of his home town. Having decided to make dentistry his life's work, he entered the dental department of Harvard University, whence he was graduated in 1899 with the degree of D.M.D. He was first associated in active practice with Dr. Dennis Keefe of Providence, R. I., but soon established an independent and most successful practice.

Dr. Power was honored by being called to fill responsible positions of professional character. He was assistant dental surgeon to the Rhode Island and St. Joseph's Hospitals

and the Academy of the Sacred Heart for several years. He was a member of the Harvard Odontological Society, the Harvard Dental Alumni Association, the New York Institute of Stomatology, the Rhode Island Dental Society, the National Dental Association, the Northeastern Dental Association, and the section on Stomatology of the American Medical Association. In recognition of his professional and personal worth he was elected in 1908 to the presidency of the Northeastern Dental Association, which in 1909 presented him with a loving-cup, and was invested with honorary membership by the Celtic Medical Association of Connecticut and the Vermont State Dental Association. He was also a member of the Delta Sigma Delta and Alpha Kappa Kappa fraternities.

Dr. Samuel A. Freeman.

Dr. Samuel A. Freeman was born in South Orange, N. J., in September 1830. He died December 11, 1911, in his eighty-second year.

His early education and training were received in the public schools of Hoboken, N. J., and later he took up the study of medicine in the New York Medical College, from which institution he was graduated with the degree of M.D. in 1855. Soon after graduation he moved to Ft. Wayne, Ind., at that time a small frontier settlement, where he began the practice of his profession. On the breaking out of the civil war Dr. Freeman enlisted in the Forty-second Indiana Volunteer Regiment as a surgeon, and immediately went to the front, where he remained, seeing much fighting, until 1863 or the early part of 1864, when owing to the breaking of his health he resigned, and was honorably mustered out of service.

In 1864 he decided to remove with his family to Buffalo, N. Y. On arriving in Buffalo he at once took up the practice of dentistry, which profession he had studied for a couple of years in the office of Dr. Knapp in Fort Wayne prior to entering the army. At once Dr. Freeman identified himself with the profession in Buffalo, entering actively into everything pertaining to the welfare and development of dentistry, especially in relation to dental organizations, and in 1864 associated himself with others in the formation of the Buffalo Dental Association, in which society he remained a member and active worker up to the time of his death. He also became a member of the Western New York Dental Association, a society which merged into the Seventh and Eighth District Dental Societies upon the formation of the Dental Society of the State of New York in 1868.

In all the movements leading up to the formation of the district and state societies Dr. Freeman took an active and influential part, and to his wise foresight and judicial counsel was due in no small measure the development of a scheme of organization for state societies not surpassed, if equaled, in all the years that have followed.

On its organization he was elected the first secretary of the Eighth District Society and served in that office for a number of years. He was elected its president in 1882, serving for one year, and in 1895 was elected librarian, and served in that office till May 1911. During his term as librarian he not only did his best and most enduring work, but, what is of more importance, he gathered together what is thought to be the most extensive and valuable dental society library in the world, and one which is expected to be known hereafter as the "S. A. Freeman Memorial Dental Library."

Dr. Freeman became a member of the Dental Society of the State of New York in 1871, and continued in active membership up to the time of his death. He was elected secretary of the society in 1875 and served in that office until 1882; he was temporary treasurer in 1907 and a member of the Fellowship committee from 1907 until the time of his death. He also became a member of the American Dental Association in 1880, continuing in active membership in that association and its successor, the National Dental Association, and rarely found absent from any of the meetings until advancing years made attendance impossible.

Indeed, his record of fidelity and devotion to all his society relationships is a worthy example to the young practitioner of today, upon whom must of necessity fall the burden of carrying on the work commenced by such men as Dr. Freeman and others who have devoted so many years of conspicuously active and faithful service, and to whom we are indebted for so much that is worthy and valuable in our profession today.

Dr. Louis D. Archinard.

Dr. Louis D. Archinard was born in New Orleans, La., in 1869, and died in New Orleans, October 12, 1911, in his forty-third year. After receiving his preliminary education in the schools of his home city, he registered as a student in dentistry in the Baltimore College of Dental Surgery, Baltimore, Md., whence he was graduated in 1891. He at once returned to New Orleans to take up the practice of his profession, in which he was eminently successful.

Dr. Archinard was one of the moving spirits who advocated and finally brought about the establishment of the department of dental surgery in Tulane University, and at the time of his demise was the only living charter member of the old New Orleans College of Dentistry, which became finally merged in the department of dental surgery of Tulane University, the deceased for years holding the elevated position of professor of operative dentistry, dental pathology, and therapeutics in both these institutions.

Dr. Archinard's profound interest in the welfare and progress of his profession was evinced by the active part which he took in the affairs and proceedings of dental organizations. He was at one time president of the Louisiana State Dental Society, at the time of his death being a member of the executive committee of that society as well as a member of the committee on papers and clinics. The success of the last meeting, held at Morgan City in June 1911, was largely due to his untiring efforts.

Dr. Archinard was also an active and energetic member of the First and Second District Dental Societies and the Odontological Society of New Orleans, the National Dental Association, the Louisiana State and Orleans Parish Medical Societies, the Association of Dental Faculties, and the National Institute of Pedagogics. He was chief of clinic to the chair of dentistry and oral surgergy of the New Orleans Polyclinic, and up to his death pursued postgraduate work in the medical department of Tulane University of Louisiana.

Dr. Safford Goodwin Perry.

Dr. Safford Goodwin Perry died December 22, 1911. He was born in Wilton, Saratoga county, New York, in 1844. He was educated in the public school of his native town. For two years he taught school, and then began the study of dentistry with his cousin, Dr. Geo. Perry of Yonkers, N. Y. He entered the Pennsylvania College of Dental Surgery November 1, 1863, and was graduated March 25, 1865. He began practice with his cousin, Dr. Geo. Perry, in Yonkers. About 1867 Dr. Perry, with his brother, opened an office on Madison Avenue in New York City.

Dr. Perry was a member of the National Dental Association, New York Dental Society, First District Dental Society, and Odontological Society, and was honorary member of a number of others. He was a member of the Knights of the Round Table, the Lotos Club, and the New York Athletic Club.

In his earlier years Dr. Perry showed considerable mechanical genius. He gave the profession a tooth crown, a separator, a dental engine and other useful devices.

He was a constant contributor to dental literature. His papers were always written in a conservative vein, and clothed in most attractive phraseology. He was looked up to by the younger men in the profession, admired by his *confrères*, respected by his equals and beloved by his companions. He had hundreds of friends, and no enemy. His was a life well spent, and his example will live amongst those that knew him as an everlasting inspiration. Thus he will ever be with us through his work. Such men never die; they prove immortality.

Dr. Auville Leroy Whitney.

Dr. Auville Leroy Whitney was born in Brownfield, Me., on March 28, 1865, and died at his home, Denver, Col., March 15, 1912, in his forty-seventh year.

He attended Tufts College Dental School in Boston, from which he was graduated in 1890. After following the pratice of dentistry for a short time in Boston, he moved to Denver.

In 1896 he took an active part in the organization of the Colorado College of Dental Surgery, in which institution he was an earnest worker. He held the chair of dental pathology and was secretary of the board of directors. In addition to his college work, he was a very successful practitioner.

Dr. Whitney was a member of the National Dental Association, the Colorado State

Dental Association, and the Denver Dental Association.

Dr. James A. Hall.

Dr. James A. Hall died at Collinsville, Ala., July 24, 1912. He was born in Oneida county, N. Y., January 15, 1841.

Dr. Hall had reached a little more than threescore and ten years of life. He received his early training in the public schools, from which he went to Rome, N. Y.; later to Gloversdale Seminary. He taught school three years, and then renewed his studies in New York City, choosing dentistry as his vocation. He practiced there about six years, when his health failed, and he moved South, in 1867. In order to build up his health he went into the railroad business, in which he continued for nine years. December 29, 1874, he married Miss Josie C. Nicholson. Seven children survive from this union.

In the year 1876 Dr. Hall settled in Collinsville, Ala., and resumed the practice of dentistry, in which he was most successful. He early identified himself with the Alabama Dental Association, of which he was a life-long active and progressive member. It was the rarest thing that he failed to attend its meetings, and although suffering from ill health was present at the last meeting in June, just a few weeks before the end. In 1894 he was elected a member of the Alabama Board of Dental Examiners. A few years later he was chosen president of that body, which position he filled until his death. His work on the board was epoch-making. He instituted the practical phase in the examinations. Being a man who kept abreast with the times, in addition to his affiliation with his state societies he was a member of the National Dental Association and the National Association of Dental Examiners, also a member of the Southern Branch of the National Dental Association. It was his custom to represent the Alabama board at the annual meetings of the National Board of Dental Examiners, and a few years ago he was elected vice-president of that body. He was elected honorary vice-president of the Fourth International Dental Congress, held at St. Louis in 1904. He represented the state of Alabama at the Lewis and Clark Dental Congress, and was one of its vice-presidents.

The death of Dr. Hall removes one of the most conspicuous and remarkable characters of the dental profession. He was not an ordinary man, and cannot be judged by the standards of ordinary men. He was aggressive in all things, and fearless of consequences in the prosecution of his endeavors. Criticism was to him a stimulus to renewed activity, failure a thing which did not enter into his calculations as a possibility. His chief ambition was the advancement of dentistry.

Dr. Chas. S. Stockton.

Dr. Chas. S. Stockton died in Orange, N. J., September 9, 1912, in the seventy-sixth year of his age. He was born at Springfield, N. J., December 1836. He began the study and practice of dentistry in 1857, later entered the Pennsylvania College of Dental Surgery (in 1868), and received from that college the degree of Doctor of Dental Surgery.

In 1870 he took an active part in the organization of the New Jersey State Dental Society. Of the twenty-seven dentists who signed the call for its formation, only three are now living. Dr. Stockton was an earnest, active worker, holding for a time, all the varied offices of the society, including the presidency in 1878. It is said of him that he was present at every meeting, taking the deepest interest in all questions that made for the betterment of the members, the society, and the public.

After a state dental law was enacted, he was appointed one of the Board of Directors and Examiners, which later he resigned on account of ill health. Dr. Stockton was a charter member of the Central Dental Association and was its president for one year. He was a member of the executive committee of the World's Columbia Dental Congress, also a member of the National Dental Association, National Association of Dental Examiners, and of the Odontological, Stomatological, and First District Dental Societies of New York.

He was keenly interested in city and local affairs, and was one of the active workers for a free library and a technical school, was a director and vice-president of the Board of Trade, member and director of the Washington Headquarters Association, and member of the Essex Country Club. He was active in the establishment of the Newark free dental

clinic, collecting personally from patients, friends and charitably disposed, the first thirteen hundred dollars. He was a pleasing speaker, ready debater, and frequent contributor to professional and other journals.

His cheerful, kindly presence will be sadly missed by the profession of New Jersey and the entire country.

WILBUR F. LITCH, *Chairman.*
JAMES MCMANUS,
CLINTON W. STRANG,
GEO. S. VANN.

On motion this report was received and ordered printed in the proceedings, and authority granted Dr. Litch to add notices of any other members who may have died prior to the date of the meeting.

Dr. J. D. PATTERSON, chairman of the Reorganization Committee, presented as the report of the committee the new Constitution and By-laws [as printed in the Appendix].

On motion this report was received and approved, and was recommended to the association for adoption, being made a special order for consideration at 1.30 P.M. Thursday. [See page 14.]

Dr. TRUMAN W. BROPHY addressed Council relative to the Sixth International Dental Congress, to be held in London, Eng., in 1914.

On motion the F. D. I. delegates of the association were authorized to look after all matters connected with the congress.

Dr. CHAS. W. RODGERS, secretary of the Army and Navy Committee, presented the report of his committee, as follows:

REPORT OF THE COMMITTEE ON ARMY AND NAVY DENTAL LEGISLATION.

TO THE NATIONAL DENTAL ASSOCIATION.

Your Committee on Army and Navy Dental Legislation has the honor and the very great satisfaction of being able to report that the most important features of the bill providing for a navy dental service were enacted by Congress, and the bill signed by the President August 22, 1912.

We could report very many interesting details of the hard-fought contest, but it should be sufficient for the present to state actual results, and leave the historic aspects for others whose perspective will enable them to view the whole field and measure accurately the relation and effect of the many incidents, more or less unpropitious, with which your committee was in immediate contact.

As indicative of the progress made in dental legislation since our last session, it is with pleasure that we report that all of the dental surgeons to be appointed in the navy dental corps take their rank from the date of their commission, while those in the army are always the lowest ranking first lieutenants, owing to the clause inserted in the army dental law making the dental surgeons rank below the medical reserve corps men.

This measure benefits the navy personnel and the profession, and we hope and trust that its greatest usefulness will be faithfully sought by those entitled to the provisions of the act.

A copy of the act is herewith attached.

Respectfully submitted,

CHAS. W. RODGERS, *Sec'y,*
WM. CRENSHAW, *Chairman.*

[*Inclosure.*]

FOLLOWING is the portion of the recent Naval Appropriation Act which appertains to the appointment of dental surgeons to the United States navy:

AN ACT

MAKING APPROPRIATIONS FOR THE NAVAL SERVICE [ETC.].

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled:

* * * * *

That a medical reserve corps, to be a constituent part of the medical department of the navy, is hereby established under the same provisions, in all respects (except as may be necessary to adapt the said provisions to the navy), as those providing a medical reserve corps for the army, and as set forth

in the "Act to increase the efficiency of the Medical Department of the United States Army," approved April twenty-third, nineteen hundred and eight.

That the appointment of not more than thirty assistant dental surgeons be, and the same is hereby, authorized, said assistant dental surgeons to be a part of the medical department of the United States navy, to serve professionally the personnel of the naval service, and to perform such other duties as may be prescribed by competent authority.

That all original appointments herein authorized shall be made by the Secretary of the navy in the grade of acting assistant dental surgeon, and all appointees to such grade shall be citizens of the United States, between twenty-four and thirty-two years of age, and shall be graduates of standard medical or dental colleges trained in the several branches of dentistry, of good moral character, of unquestionable professional repute, and before appointment shall pass satisfactory physical and professional examinations, including tests of skill in practical dentistry, of proficiency in the several usual subjects in a standard dental college course, and in such other subjects of general education as are now or may hereafter be required for admission to the medical corps of the navy.

That at the end of three years from the passage of this act all acting assistant dental surgeons who have had two or more years' service under their original appointment, as herein provided, shall undergo such physical and competitive professional examinations as the Secretary of the navy may prescribe to determine their fitness to receive commissions in the navy, and if found qualified they shall be appointed assistant dental surgeons, with the rank of lieutenant (junior grade), in the order of standing as determined by the professional examinations provided for in this act.

That after the competitive examinations provided for in section three of this act have been held, acting assistant dental surgeons thereafter appointed shall serve a probationary period of three years, and upon the completion of such period shall undergo such examinations as the Secretary of the navy may prescribe to determine their fitness to receive commissions in the navy, and, if found qualified, they shall be appointed assistant dental surgeons, with the rank of lieutenant (junior grade).

That if any acting assistant dental surgeon shall fail upon the examinations prescribed in this act he shall be honorably discharged from the naval service, and the appointment of an acting dental surgeon may be revoked at any time in the discretion of the Secretary of the navy.

That all appointees authorized by this act shall take rank and precedence in the same manner in all respects as in the case of appointees to the medical corps of the navy, and shall not exercise command over persons in the navy other than dental surgeons and such enlisted men as may be detailed to assist them by competent authority.

That all officers of the dental corps authorized by this act shall receive the same pay and allowances as officers of corresponding rank and length of service in the medical corps of the navy.

That all officers of the dental corps authorized by this act shall be eligible to retirement in the same manner and under the same conditions as officers of the medical corps of the navy: *Provided*, That section fourteen hundred and forty-five of the Revised Statutes of the United States shall not be applicable to the officers herein authorized: *And provided further*, That the dentist now employed at the Naval Academy shall not be displaced by the operation of this act, and he shall have the same official status, pay, and allowances as may be provided for the senior dental surgeon at the Military Academy.

That the Secretary of the navy is hereby authorized to appoint, for temporary service, suitably qualified acting dental surgeons when necessary to the health and efficiency of the personnel of the naval service: *Provided*, That the total strength of the dental corps, including those appointed, for temporary service under this act, shall not exceed the proportion of one to each thousand of the authorized enlisted strength of the navy and marine corps: *Provided further*, That appointments issued under authority of this act may be revoked at any time, shall have no legal force or effect except for the time the temporary appointee is in active service, and shall include no right of retirement.

That all appointments authorized by this act, except the appointment of acting dental surgeons, shall be made by the President, by and with the advice and consent of the Senate.

That all laws and parts of laws inconsistent with the provisions of this act be, and the same are hereby, repealed: *Provided,* That the tests of qualifications for appointment to the said reserve corps and to the dental corps may be varied to suit the subjects of such branch of the healing art or speciality of surgery of which specialists may be required, and in the discretion of the Secretary of the navy such specialists may be grouped separately: *Provided further,* That of the dental surgeons hereby authorized to be appointed to said medical reserve corps and to the said dental corps, the whole number ordered to active duty shall not exceed the number the Secretary of the navy may deem actually necessary to the health and efficiency of the personnel of the navy and marine corps, and in time of peace the number shall not exceed the proportion of one dental officer to one thousand of said personnel.

On motion the report was received and ordered printed in the Transactions.

Lieut. S. D. Boak, of the army dental corps, addressed the Council on "Army Dental Service," which was continued by Drs. Voight, Donnally, and Grady.

On motion the Executive Council thanked the representatives of the army dental corps for their presence and suggestions, and invited them to come before the Council at any time in the future.

On motion adjourned until 3 P.M.

September 12th, 3.15 P.M.

The Council was called to order at 3.15 P.M., with Dr. Burkhart presiding and Drs. Melendy, Warner, McManus, and Brown present.

Dr. Emory A. Bryant presented the following resolution, which on motion was approved and recommended to the association for adoption:

Resolved, That the National Dental Association, in annual session assembled, views with alarm the passage of laws unduly restricting the members of the dental profession in the exercise of their respective duties.

Resolved, That this association most heartily indorses the proposed amendment to the pharmacy laws of the District of Columbia by the bill H. R. 8619—viz: "Provided further, That the above provision shall not apply to sales at wholesale by jobbers, manufacturers, dental supply houses, and retail druggists, to retail druggists, hospitals, colleges, scientific or public institutions, and dentists in the actual practice of their profession"—and most earnestly urge Congress to pass the same, that it may become a law.

Resolved, That the Secretary be instructed to forward a copy of these resolutions to the chairmen of the Committees on District of Columbia of the Senate and House of Representatives, Hon. J. H. Gallinger and Hon. Ben. Johnson, respectively.

These resolutions were passed at the Friday general session. [See page 14.]

Dr. C. M. McCauley addressed the Council, as a representative from Section I, regarding a Research Fund for investigation. After some discussion he was authorized to confer further with Dr. Weston A. Price, chairman of Section I, and to report later.

On motion adjourned.

FRIDAY—September 13th.

The Executive Council met in the library of the New Willard at 9.45 A.M. Dr. Burkhart presiding and Drs. Melendy, Warner, Smith, McManus, Hetrick, Hinman, and Brown present.

Dr. J. D. Patterson, chairman of the Reorganization Committee, offered the following resolution with reference to

REPORT OF THE TREASURER.

RECEIPTS.

Balance on last settlement	$1,553.04	
Received from dues to July 19, 1911	1,335.00	
" " " Southern Branch	374.00	
		$3,262.04

DISBURSEMENTS.

By A. R. Melendy, former Treasurer:

Henry C. Ferris, Scientific Research Com.	$100.00	
H. J. Burkhart, meeting in Cleveland	20.00	
D. O. M. LeCron, Clinic Committee, exp.	431.35	
A. R. Melendy, Treasurer, salary and exp.	295.45	
H. C. Brown, Rec. Sec'y, salary and exp.	577.60	
H. C. Brown, sec'y Revision Committee, exp.	76.50	
L. L. Barber, Section II, exp. (2 yrs.)	25.00	
New Franklin Printing Co., printing	380.17	
Chas. McManus, flowers, Mrs. Gaylord's funeral	15.00	
A. O. Ross, exp. sec'y Clinic Committee	22.08	
M. B. Ferris, stenog., Revision Committee	4.00	
M. F. Finley, exp. ch'man Pharmaceutical Committee	4.10	
Wms. Donnally, exp. Army Legislation	353.40	
Chas. W. Rodgers, exp. Army Legislation Committee	73.00	
Wm. Crenshaw, exp. Army Legislation Committee	63.40	
W. G. Ebersole, exp. Oral Hygiene Committee	220.40	
J. P. Corley, " " " "	96.00	
H. C. Thompson, " " " "	25.00	
Conrad B. Syme, legal services	25.00	
W. R. Clack	2.04	
A. R. Melendy, stamps, express, mailing Trans.	8.25	
		$2,817.74
Balance Nov. 4, 1911		$444.30

RECEIPTS.

Rec'd from A. R. Melendy, former Treasurer, Nov. 4, 1911	$444.30	
Rec'd from dues, after Nov. 4, 1911, to Aug. 31, 1912	1,665.00	
Rec'd from Harvard Odont. Soc., acct. Oral Hygiene Committee	25.00	
		$2,134.30

DISBURSEMENTS.

By H. B. McFadden:

H. C. Ferris, balance in full, Research Com.	$171.58	
A. R. Melendy, Council meeting, Washington, D. C., Nov. 4, 1911	50.50	
Chas. McManus, Council meeting, Washington, D. C., Nov. 4, 1911	22.00	
B. Holly Smith, Council meeting, Washington, D. C., Nov. 4, 1911	4.00	
H. J. Burkhart, Council meeting, Washington, D. C., Nov. 4, 1911	42.00	
H. C. Brown, Council meeting, Washington, D. C., Nov. 4, 1911	43.00	
Chas. C. Southwell, concerted filling contests	24.00	
American Bonding Co., Baltimore, Md.	20.00	
Waldo E. Boardman, meeting Oral Hygiene Committee, Cleveland	48.54	
S. S. White Dental Mfg. Co., cartons, postage, addressing and mailing 1911 Transactions	204.64	
Transferred to Journal Fund from dues July 19, 1911, to August 31, 1912	552.00	
		$1,182.26
Balance General Fund		$952.04

NATIONAL RELIEF FUND.

Fund with interest to July 1, 1912	$4,491.89

JOURNAL FUND.

Balance from last report	$861.34	
Interest to July 1, 1912	33.99	
From 1912 dues, from July 19, 1912, to August 31, 1912	552.00	
		$1,447.33

Approved September 12, 1912:

V. H. Jackson, M. F. Finley, V. S. Jones, *Auditing Committee.*

Respectfully submitted,

H. B. McFadden, *Treasurer.*

the change from the present to the new constitution:

RESOLVED, That at the 1913 session of the National Dental Association and on the third day thereof, the first house of Delegates shall convene for a single session for the election of officers, the appointment of committees, and such other business as may be necessary for placing the new constitution in operation, and the same members composing the house of Delegates shall serve as the house of Delegates at the session for 1914, and their terms of office shall begin thereat.

Dr. J. D. PATTERSON, chairman of the Executive Committee, made a brief report relative to transportation arrangements, stating that a sufficient number of certificates were presented to secure reduced rates for those returning over the Grand Trunk and New England associations lines.

Dr. BURTON LEE THORPE addressed the Council with reference to the organization and duties of the F. D. I. delegates. On motion they were directed to meet and select their own officers and to represent the interest of the association in all matters connected with the Sixth International Dental Congress.

On motion Dr. James Truman was appointed a committee of one with authority to solicit funds for Dr. Wms. Donnally, in accordance with the resolution presented by him, and adopted by the association. [See page 14.]

On motion the Publication Committee was directed to publish the resolution presented by Dr. James Truman with reference to soliciting funds for Dr. Wms. Donnally and to refer the transcript of his preliminary remarks, and the letter read in conjunction therewith, to the Committee on History.

On motion the Secretary and President were authorized to draw an order for $200 in favor of Dr. Wms. Donnally, when the funds of the treasury would justify the same.

Dr. H. B. MCFADDEN then presented his report as Treasurer [see opposite].

Dr. V. H. JACKSON, chairman of the Auditing Committee, presented their report, together with the bills which had been presented to their committee:

REPORT OF THE AUDITING COMMITTEE.

September 13, 1912.

TO THE EXECUTIVE COUNCIL:

After examining the Treasurer's books and accounts, the Auditing Committee respectfully report that they have found them correct and have approved the same. The committee have also audited all accounts and bills presented to date, and herewith append signatures.

Respectfully,

V. H. JACKSON,
M. F. FINLEY,
V. S. JONES,
Auditing Committee.

On motion the report was received and the Secretary directed to draw orders for payment of the approved bills.

On motion the Secretary was directed to thank Dr. John David, Corsicana, Texas, for the ebony gavel which he had so kindly furnished for the President this year.

On motion the Secretary was directed to draw orders for the Secretary's and Treasurer's salaries.

Dr. EUGENE R. WARNER presented the following resolution, which was unanimously adopted:

RESOLVED, That in addition to the compensation paid the Recording Secretary, he be authorized to employ a competent stenographer, at a salary not exceeding $50.00 per month, and he is further authorized to draw monthly orders in payment thereof.

On motion the Secretary was directed to thank the Secretary of War for sending representatives to the meeting, and express the hope that such co-operation may continue from year to year.

Dr. Weston A. Price addressed the Council relative to the advisability of investigating the possibilities of securing assistance or co-operation in doing certain experimental and research work.

On motion Drs. Weston A. Price, Arthur R. Melendy, and C. M. McCauley were appointed as a special committee to investigate and report at the next meeting.

Dr. C. B. Warner addressed the Council relative to protective insurance for dentists.

On motion Dr. C. B. Warner was appointed a special committee of one to investigate this question and report at the next meeting.

On motion the President, Recording Secretary, and chairman of Executive Council were appointed as an *Ad Interim* Committee to attend to such *ad interim* business as may come up, take care of any necessary committee changes, etc.

On motion adjourned.

Homer C. Brown,
Recording Secretary.

SPECIAL SESSION—September 12th, 9 p.m.

The Executive Council met in a special session Thursday, September 12th, at 9 p.m., to appoint committees for the year.

Dr. Burkhart presided, with Drs. Hetrick, Warner, Hinman, and Brown present.

The section officers and committees were selected. [See Appendix for list.]

Some time following the meeting the chairman of the Publication Committee received reports from Drs. C. N. Johnson and Truman W. Brophy, Delegates respectively to the Third Australian Dental Congress and the International Dental Federation, which are herewith incorporated in the Transactions:

REPORT OF THE DELEGATE TO THE THIRD AUSTRALIAN DENTAL CONGRESS.

To the Officers of the National Dental Association.

Gentlemen,—You did me the very great honor of appointing me your delegate to attend the Third Australian Dental Congress, which was held in Brisbane, Queensland, July 8–13, 1912, and I hereby beg leave to submit my report.

The meeting was in every way a notable success, and it will undoubtedly add much to the advancement of dentistry in Australia. The program consisted of the formal opening exercises by the Governor of Queensland, His Excellency Sir Wm. MacGregor, G.C.M.G., C.B., M.D., LL.D., D.Sc., who delivered a most learned and appropriate address, followed through the week by scientific papers, clinical demonstrations, and the usual routine of such meetings in our own country. The only other countries represented at the congress outside of Australia were Great Britain, in the person of Dr. F. Canton, representing the British Dental Association, and New Zealand, in the person of Dr. O. V. Davies of Dunedin.

The character of the papers read at this congress was of a high order, and the clinics were most interesting. Your delegate found the men of Australia and New Zealand alert, eager for knowledge, and well up to date professionally. Never has he met a similar body of men more thoroughly familiar with dental literature than they, or more alive to the recent advances in dentistry.

A pleasing feature of the meeting was the royal entertainment furnished by the Queens-

land contingent. From the opening of the congress until its close the weightier professional events were interspersed with social functions of all kinds, which tended greatly to relieve the meeting of any possibility of tedium or weariness.

Your delegate wishes particularly to record his keen appreciation of the delicate courtesy and consideration shown him everywhere by the profession. At the opening exercises the hall was decorated with the Stars and Stripes floating beside the Union Jack, and everything was done from first to last to make the visitor feel at home. At the risk of exceeding the functions of a formal report I cannot close without a word of thanks for all this courtesy, nor without a special plea to my *confrères* of America to reciprocate with Australians or New Zealanders whenever opportunity presents. I feel that the *entente cordiale* among the profession of these countries means much for the mutual benefit of each, and the progress of dentistry generally.

Thanking you for the honor of my appointment as your delegate, I am

Fraternally yours,

C. N. JOHNSON.

REPORT OF DELEGATE TO THE F. D. I. MEETING IN STOCKHOLM.

TO THE OFFICERS AND MEMBERS OF THE NATIONAL ASSOCIATION:

As the accredited delegate from your body to the annual meeting of the International Dental Federation at Stockholm, held August 28 and 29, 1912, I submit to you the following report:*

The opening session took place on Wednesday morning, August 28th, in the Aula of the University of Stockholm. On the invitation of Mr. W. B. Paterson (president of the Federation), Prof. Wilhelm Leche took the chair as honorary president.

Professor LECHE, on behalf of the Rector of the University, delivered an address of welcome.

Mr. PATERSON, in the name of the F. D. I., thanked Professor Leche and the authorities of the University for their hospitable welcome, and for the use of the University buildings.

President W. B. PATERSON then delivered his annual address.

Delegates from the various national associations responded for their countries: Hofrat Professor O. Walkoff for Germany; Truman W. Brophy for America; W. Guy for Great Britain; Dr. G. Wolf for Austria; Dr. E. Rosenthal for Belgium; Dr. Valenzuela for Chile; Dr. Christensen for Denmark; Dr. Aguilar for Spain; Dr. Roy for France; Dr. Guerini for Italy; Dr. Van der Hoeven for Holland; Dr. Ottesen for Norway, and Dr. Shmamine for Japan.

Professor Dr. JESSEN of Strasburg, president of the Commission on Hygiene, presented a report from the Commission.

Mr. HUET, president of the Commission on Bibliography, gave a brief address.

EXECUTIVE COUNCIL.

The Executive Council met on Wednesday morning, August 28th, Mr. W. B. Paterson, president, in the chair.

There were present: F. Schaeffer-Stuckert, secretary-general; W. Guy and M. Roy, adjoint secretaries; E. Rosenthal, treasurer; F. Aguilar, M. Ayrapaa, T. W. Brophy, C. Christensen, W. Dieck, E. Förberg, V. Guerini, W. Harrison, Van der Hoeven, E. Huet, J. Shmamine, — Valenzuela, O. Walkoff.

The PRESIDENT read a letter of congratulation from Dr. Wms. Donnally, announcing the appointment in the United States of America of sixty commissioned naval dental officers.

Professor BROPHY expressed his conviction that the influence of the International Dental Federation had been a potent factor in producing this result.

The question of members of the F. D. I. participating in the work of the Section on Stomatology of the International Medical Congress, to be held in London in August 1913, was taken up for consideration.

On the motion of Professor WALKHOFF, seconded by Dr. ROSENTHAL, it was resolved:

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* Dr. Brophy's report is here printed in brief abstract only, reports of the meeting, with abstracts of papers, etc., having already appeared. (See *Dental Cosmos* issues for January and February 1913.)

"That, inasmuch as the International Medical Congress has refused the admission of dentists to the congress, the F. D. I. does not approve of its members contributing to the Section of Stomatology; but the F. D. I. has no objection to its members contributing papers or communications to other sections of the International Medical Congress."

Dr. BROPHY presented an invitation from the National Dental Association of the United States to the F. D. I. to hold its next meeting in America.

THE MILLER PRIZE.

The Council then considered the question of the award of the Miller Memorial prize.

The PRESIDENT announced that he was prepared to receive nominations of candidates.

Dr. BROPHY offered the name of Prof. Carl Röse.

Dr. AGUILAR seconded the nomination of Dr. Röse.

M. ROY said he was requested by the Fédération Dentaire Nationale of France to submit the candidature of their *confrère*, Dr. Godon.

Dr. ROSENTHAL seconded the nomination of Dr. Godon.

A vote by ballot was then taken, and resulted in favor of Dr. Godon.

Dr. AGUILAR presented the report of the International Miller Prize Fund Committee, and also the accounts, which showed the actual capital of the Miller Prize Fund to be nearly 63,000 francs.

Dr. SCHAEFFER-STUCKERT proposed that a duplicate of the Miller prize medal in bronze be provided for the new Dental Institute in Berlin, to be opened in October 1912.

Dr. AGUILAR suggested that a duplicate also be sent to the Thomas W. Evans Institute to be opened in Philadelphia in October 1913.

Dr. BROPHY seconded both propositions, which were carried.

The session then concluded.

COMMISSION OF HYGIENE.

The most conspicuous and impressive work of the Stockholm meeting was by the Commission of Hygiene. It could not be otherwise, with the great founder of international work in oral hygiene, its president, Prof. E. Jessen, at its head; with the commission under the protection of His Majesty, King Gustave V. of Sweden; with the presence of America's active, efficient, and beloved Horace Fletcher, who impressed upon the dental teachers and representatives of the nations of the world the tremendous influence exerted by their profession in preventing disease by observing the teachings of modern hygiene, and the inestimable benefits resulting from thorough mastication and insalivation of food. Dr. Fletcher's address was listened to by a large and deeply interested audience.

The work of the commission is too voluminous to report in full. I would recommend all members of the N. D. A. to procure from the secretary-general, Dr. Schaeffer-Stuckert, Frankfort a. M., Germany, a copy of the Transactions as soon as they are published, from which the most valuable information may be obtained as to the various sections of the Federation.

The address of President Jessen and that of Secretary Lenhardtson; the papers—"Proposal for Systematic Treatment of Children in Higher-Grade Schools by Private Dentists," by Professor Christensen of Copenhagen; by Professor Lagerheim of Stockholm, on "Swedish National Bread and Its Value in Oral Health"; by Dr. Wolf of Vienna, on "The Care of the Teeth of School Children in Austria"; "Raw Carrots as an Important Factor in Dental Hygiene," by Dr. Christensen of Copenhagen, together with Dr. G. Cunningham's cinematograph lecture and Dr. Horace Fletcher's address—all are valuable contributions to dental literature, and should be read by progressive dentists.

PLACE OF NEXT MEETING.

The PRESIDENT said the last item on the agenda was the decision to be taken as to the place of meeting for 1913. After the question had been fully canvassed, a motion was made by Dr. Rosenthal that the F. D. I. meet in America in 1913. This was seconded by Dr. Dieck of Germany. Holland and Spain were also nominated. A ballot taken showed the election of America.

On my return to America I was presented with a letter from the Federation, by Dr. Aguilar, who was in attendance upon the meeting of the N. D. A. in Washington. This letter stated that inasmuch as the enormous amount of work of preparing the International Dental Congress to be held in London

in 1914 would largely devolve upon the English, if the National Dental Association were willing to defer the American meeting of the F. D. I. until 1915 it would greatly facilitate the work of organizing the International Dental Congress. Moreover, few of the English representatives would find it possible to come, on account of the work of preparing for the congress.

The question was presented to the Executive Council of the N. D. A., and the hardships pointed out that it would evidently work on the English to come to America at a time when their services were needed at home in organizing the congress. A motion was made and unanimously carried by the Executive Council of the N. D. A. to conform to the wishes of the officers of the F. D. I., and defer the holding of the meeting in the United States until 1915.

Therefore, the meeting of 1915 will probably occur at the place and on the date of the meeting of the National Dental Association of that year.

Commission on Education.

Unfortunately President Edward C. Kirk was unable to be present. He sent a report, however, which set forth his views regarding the present status of education in dentistry in the various countries of the world.

His Majesty, King Gustave, held a special reception at the palace, on Wednesday, August 28th, which was attended by the officers and members of the Federation.

Respectfully submitted,

Truman W. Brophy.

REPORT OF COMMITTEE ON CREDENTIALS.

The Credentials Committee reported that the following had presented proper credentials and were admitted to permanent membership:

Henry L. Adler, Dallas, Texas.
Jos. A. Allen, Sheffield, Pa.
Guy W. Angelo, Washington, D. C.
J. S. Ashbrook, Pittsburgh, Pa.
C. C. Bachman, Waterloo, N. Y.
E. I. Bachus, Colorado Springs, Colo.
E. S. Barber, Chicago, Ill.
Abram C. Barclay, Pittsburgh, Pa.
George L. Beerbower, Terra Alto, W. Va.
John Alden Bliss, Des Moines, Iowa.
Lewis S. Breed, Boston, Mass.
Holly V. Brockett, Kansas City, Mo.
Andrew J. Brown, Washington, D. C.
Clarence E. Burgson, Leavenworth, Kan.
Clarence M. Burris, Randolph, Neb.
C. K. Chapman, Webster Springs, W. Va.
James L. Clements, Buffalo, N. Y.
C. Bunting Colson, Charleston, S. C.
A. H. Corbett, Atkinson, Neb.
W. G. Crandall, Spencer, Iowa.
A. B. Crane, Washington, D. C.
J. W. Culver, Cleveland, O.
Roscoe A. Day, Oakland, California.
Clarence S. DeLong, Reading, Pa.
Geo. F. DeLong, Reading, Pa.
W. E. Dieffenderfer, Colorado Bldg., Washington, D. C.
E. B. Ducasse, New Orleans, La.
Geo. A. Englert, Catskill, N. Y.
Nathan A. Estes, Newport, R. I.
Arthur M. Flood, San Francisco, Cal.
E. L. Fortiers, Audubon Bldg., New Orleans, La.
Fred C. Gilmore, Columbia, S. C.
C. E. Golly, Spencer, Iowa.
B. L. Gore, Audubon Bldg., New Orleans, La.
E. J. Greenfield, Wichita, Kan.
Geo. T. Gregg, Westinghouse Bldg., Pittsburgh, Pa.
Carl S. Henry, Allentown, Pa.
John D. Hertz, Stamford, Conn.
Fred E. Hess, Fairmont, W. Va.
A. W. Hoyt, Chicago, Ill.
Clinton G. Hughes, Pittsburgh, Pa.
Morgan L. Hulme, Rochester, N. Y.
R. G. Hutchinson, New York City.
David W. Johnston, New Haven, Conn.
Ailzas Kassab, Chester, Pa.
H. J. Kauffer, New York City.
Chas. I. Keely, Hamilton, Ohio.
W. J. Koelz, Keyser, W. Va.
C. V. Kratzer, Reading, Pa.
Thomas H. Leathers, Champaign, Ill.
Clay W. Leps, Fairmont, W. Va.
Joseph M. Levy, New York City.
E. A. Lundy, Los Angeles, Cal.
Claude A. Martin, Winfield, Kan.
M. A. Mason, Fort Wayne, Ind.
P. B. McCullough, Philadelphia, Pa.
Carl J. Mess, Washington, D. C.

Herbert C. Miller, Portland, Oregon.
Jesse Miller, Maryville, Mo.
John Molyneaux, Oxford, Ohio.
Herbert T. Moore, San Francisco, Cal.
Richard J. Morris, Evansville, Ind.
Chas. B. Munson, Washington, D. C.
H. Janney Nichols, Washington, D. C.
Wm. L. Northen, Talladega, Ala.
C. Wesley Orr, Brooklyn, N. Y.
Frank C. Pague, San Francisco, Cal.
John E. Patterson, Poughkeepsie, N. Y.
Horace E. Perlie, Washington, D. C.
Henry H. Phillips, Cincinnati, O.
D. F. Pyle, Washington, D. C.
Sidney J. Rauh, Cincinnati, O.
Chas. E. Redmon, Peru, Ind.
Alex. H. Reynolds, Philadelphia, Pa.
Thos. J. Rice, Washington, D. C.
R. F. Rowdybush, Decatur, Ill.
S. C. A. Rubey, Warrensburg, Mo.
Wm. G. Schafhirt, Washington, D. C.
F. F. Schlueter, Watertown, Wis.
Frank H. Schultz, Washington, D. C.
W. Busey Simmons, Piedmont, S. C.
F. M. Smith, Chester, Pa.
R. L. Spencer, Bennettsville, S. C.
Daniel H. Squire, Buffalo, N. Y.
Ira B. Stilson, Providence, R. I.
Dyer B. Talley, Syracuse, N. Y.
Bruce L. Taylor, Washington, D. C.
Richard T. Taylor, Cincinnati, O.
Almon F. Townsend, Worcester, Mass.
R. H. Volland, Iowa City, Iowa.
J. E. Waterbury, Hollywood, Cal.
Geo. H. Watson, Berlin, Germany.
Leuman M. Waugh, Buffalo, N. Y.
Luther M. Weaver, Philadelphia, Pa.
Chas. W. B. Wheeler, New York City.
Benj. B. White, Terre Haute, Ind.
Jesse L. Williams, Jacksonville, Fla.
A. S. Wolfe, Washington, D. C.
Edmund N. Wood, Birmingham, Ala.
J. A. Woofter, Weston, W. Va.
H. C. Young, Washington, D. C.

HOMER C. BROWN,
Recording Secretary.

President's Address.

By Dr. ARTHUR R. MELENDY, Knoxville, Tenn.

FELLOW MEMBERS OF THE NATIONAL DENTAL ASSOCIATION, LADIES AND GENTLEMEN:

It is with difficulty that I find language by which I may fitly express to you my deep appreciation of the many honors which you have conferred upon me from year to year. For five consecutive years I was unanimously chosen for the honored office of treasurer of your association, the duties of which position, though laborious, I found to be not unpleasant by reason of the uniform courtesy and consideration shown me by all of the members; and in the discharge of those duties it has been my pleasure to form many lasting friendships and to make many enjoyable acquaintances among the members, all of which I will ever prize most highly.

THE PRESIDENTIAL HONOR.

When, at the last annual session of this body, you again unanimously conferred upon me the highest honor within your power to give, my cup of joy seemed full to overflowing, and I would be remiss in the finer feelings of true manhood did I not take this opportunity of expressing to each and every one of you the pleasure and gratitude which I so truly and deeply felt at receiving the new honor which you then bestowed upon me. I desire also to express my appreciation of the very efficient and loyal services of our recording secretary, whose duties this year have been particularly arduous, to the Executive Council, Executive Committee, the Local Committee, and to all of the officers and committeemen, the faithful and united efforts of all of whom have made possible the presentation of our splendid program for this meeting, so rich in scientific data, progressive thought, and advanced operative methods.

THE NATIONAL CAPITAL AS HOST.

At the invitation of the District of Columbia Dental Society we have assembled in our national capital for our annual session. As a people we have long believed that ours is the greatest nation on earth, and the world is rapidly coming to accept our faith in our country and belief in its greatness as fact. We are proud of our capital city. We are proud of its magnificent system of parks, broad boulevards, beautiful homes, public buildings, art galleries, impressive monuments, and above all, its splendid citizenship. That it is now or in the not far distant future will be the most beautiful capital

city of all the nations of the world, we firmly believe; and it is indeed a great privilege which we enjoy, to meet under such favorable and auspicious environment. And I feel confident that this session will be an epoch-making one in the history of our association.

IN MEMORIAM.

As friend meets friend today in the exchange of happy greetings, the thoughts of many hearts are turned to the absent ones. Some are detained by illness, some by duty, and others have passed to the great unknown.

To the past go more dead faces,
Every year,
As the loved leave vacant places,
Every year:
Everywhere the sad eyes meet us,
In the evening's dusk they greet us,
And to come to them entreat us,
Every year.

But the truer life draws nigher,
Every year;
And its morning star climbs higher,
Every year:
Earth's hold on us grows slighter,
And the heavy burden lighter,
And the Dawn immortal brighter,
Every year.

Shall we stand for one minute and in silent meditation honor the memory of our comrades who during the year have passed from this life into the mystery of the immortal.

THE YEAR'S PROGRESS.

During the year past nothing of a particularly unusual character has taken place in the dental world. We have been going steadily forward, assimilating and putting into actual practice the many great truths which have been advanced, and have been keeping fully abreast with the progress of the world in scientific achievement. Of course, there are insistent problems, lots of them, and there are professional abuses too. The twentieth century has introduced innovations faster than we have been able to absorb them. Invention has crowded upon invention; labor-saving and time-saving devices have poured upon us as in a steady flood. Not only in methods of treatment and practice is this change noticeable, but the very furniture in our offices is undergoing a process of evolution. The people are becoming better educated; there is a higher intelligence in the masses, and their demand is for more efficient service. In the midst of all this, we might reasonably expect confusion and disorder; but not so. In the main the profession is to be congratulated upon the steadfast manner in which it is solving these problems and is adapting standards of education, conduct, and practice to harmonize with and meet the demands of the progressive age in which we live. Thus we stand today in the midst of great things, a great age, an age of immense vitality, growth, change, and development, and it is just as certain as anything can be that we are going to maintain the standard of progress in our profession in a degree equal to that exhibited in any of the learned professions. There is going to be a greater desire for truth, a keener scientific attitude toward new ideas, and our vision is going to be incalculably widened with each succeeding year.

NATIONAL DENTAL RELIEF FUND.

Most of the work of the year will be presented to you through the reports of your committeemen and sections. I de-

sire, however, to call your special attention to the appointment of a committee to solicit and have charge of the National Relief Fund. In compliance with the resolution passed at last session I appointed on this committee Dr. L. G. Noel of Nashville, Tenn., Dr. E. S. Gaylord of New Haven, Conn., and Dr. W. T. Chambers of Denver, Colo. The plan which they have adopted, of asking each state to add one dollar to its annual dues, to be transmitted by the treasurer to the National Relief Fund, is a simple, dignified, and equitable one, and it affords an opportunity for all to help their fellowmen. Tennessee and Colorado unhesitatingly adopted this plan, and several other states have taken favorable action. Some states seem fearful that the addition of even one dollar to the dues will cause a loss of membership, but when the object is fully explained and understood, I am sure all will most gladly and systematically contribute. The surplus of the California relief fund was by resolution placed in charge of this committee as a nucleus, and disbursements must conform to the restrictions of that gift. That fund was accepted by the National Dental Association in 1907, and the resolution controlling it was as follows:

RESOLVED, That the balance of the money now in our hands be turned over to the National Dental Association, to be used as a nucleus for a National Relief fund, the same to be invested in securities which can be quickly realized upon in case of necessity, the interest of which may be employed for the use of superannuated dentists and the principal for the relief of dentists who may suffer from any calamity such as flood, earthquake, or fire.

This fund has been held in the savings department of a national bank at four per cent. interest as most nearly complying with the above resolution, and I commend this very worthy cause to your earnest consideration, and ask that each of you feel that it is his high privilege and duty to co-operate with this committee, in your several states.

REVISION OF CONSTITUTION OF N. D. A.

Another resolution passed at the last meeting is that upon the revision of the constitution, and I ask your permission to read that, because it is of the utmost importance that you act intelligently on a question of such grave significance as a revision of the constitution. The resolution is as follows:

RESOLVED, That in accordance with the expressed wish of the state delegates to the meeting which considered the alteration of the constitution, the National Dental Association will organize along the lines of the American Medical Association.

RESOLVED, That the draft of the constitution drawn in conformity with the above, be printed and forwarded to the state societies with the request that such as desire shall make application for constituent membership at the next meeting, stating how many members they can guarantee.

RESOLVED, That if properly supported by the state societies, the Constitution and By-laws will be finally revised and adopted at the next meeting, the same to take effect at the meeting of 1913.

I am credibly informed that twenty-five of the states have taken favorable action upon this resolution, and the Revision Committee may consider that they have sufficient support to warrant them in reporting the new constitution for your adoption. To my mind, the question of financing the new plan for the first year or two is going to be a serious one, for the reduction of the annual dues from five to two dollars necessarily calls

for a very large increase in membership. As treasurer I have had an opportunity to become somewhat familiar with our expenditures, and in conjunction with the Executive Council have endeavored to conduct the preparations for this meeting on as economical a basis as possible, and yet we shall probably require every cent in the treasury to meet the necessary expenses incident to the same. We have been compelled to refuse requests for money for research work along a line that would, I am sure, prove of great benefit to the profession. Hence I say to the Revision Committee: Be sure you look carefully to the question of finance in formulating your report. Do not misunderstand me; I am heartily in favor of this movement after the example of the American Medical Association, but I am perhaps over-anxious that these important details be not overlooked. We need not merely a change, but a change to something better than we have, otherwise we cannot claim to be going forward. The National Dental Association was organized with a membership of three hundred and fifty-seven, and the last report shows a membership of about eight hundred and fifty, having more than doubled since the American and Southern Societies were merged into the National, and its influence and helpfulness to the profession are more and more apparent each year. The ambition for a larger, more powerful, more representative, and more efficient National body is a laudable one, and one in which we are all agreed, our only differences being as to the best and most equitable methods to attain this end. I am very hopeful that when the Revision Committee present their report, it will be so carefully worked out in detail that we may adopt it, and by so doing take another great step forward.

THE FORSYTH DENTAL INFIRMARY.

We read of benefactions galore for carrying forward experimental, educational, or humanitarian work in the healing art, but in our own special field the only benefactions of any considerable amount of which I am aware are those of the late Dr. Thos. W. Evans of Paris, France, for dental educational and research work, and the Forsyth Dental Infirmary for children, the corner-stone of the building for which was laid on June 4, 1912, with appropriate ceremonies, in the city of Boston. This building is being erected and munificently endowed for the perpetuation of its work by two brothers, as a memorial to their deceased brother, and what a truly noble memorial it will be! "Dedicated to the children," to bring about a stronger and healthier generation.

BENEFACTIONS FOR THE ADVANCEMENT OF DENTAL SCIENCE TO BE URGED.

This brings me to the question, Why should there not be other large benefactions for the advancement of scientific dental education for the relief of the suffering poor, for the promulgation of the science of hygiene of the mouth? Surely the care and treatment of the mouth and its contained organs is not a matter of minor importance in the economy of the human system, neither can it be truthfully said that as specialists we are not worthy of encouragement in our efforts, nor that our work is not eminently necessary to the care, development, and protection of the human race. I believe that the fact that so few benefactions are made for our special branch of the healing art is due to the general lack of information on the subject. Those who have money

which they would gladly give to a worthy cause have no means of learning about the need of gifts in the great field of dentistry. And how are they to know? How shall they hear without a preacher, and how shall a preacher go unless he be sent? We, the National Dental Association, are the largest representative dental organization in this country, and from this body should emanate the knowledge which shall move the philanthropic rich to remember us in their benefactions. Hence I suggest—yes, urge—that you shall appoint a committee of three whose duty it shall be to present to the proper parties the just claims of our profession to a proportionate part of the benefactions of the world; and this will include the careful exposition of the importance, the needs, and possibilities for good to the human race of such benefactions. In brief, it will be a bureau of information upon this subject.

GOVERNMENT SUBSIDY FOR DENTAL RESEARCH URGED.

From several different sources, my attention has been called to the fact that as a profession we are not reaping the benefits from governmental investigations along scientific and educational lines that we should, principally because we are not in touch with what is being done by our government. The passage of the bill in Congress changing the scope of the Public Health and Marine Hospital Service is of such broad character that now we may hope for some assistance in research work, or we may be able to gain from it a plan which will work to our advantage in studying the ravages of the diseases of the mouth. The assistance which Dr. Kebler of the bureau of Chemistry has given us in making his report on dental mouth preparations is but one instance of the benefits which we might receive from this source. We now have a dental corps in both the army and navy, and I feel that it is incumbent upon the National Dental Association to take some steps toward preserving and utilizing the knowledge which is being passed over and lost to the profession and to the world. To my mind the establishing under the authority of this association of a professorship or chair in research work, and the securing of one competent man who shall devote all of his time to this work at a fixed salary, would be the most practical plan to begin with; and later, when we shall have done some effectual work, when we can show that the findings of such a scheme have tended to the relief of conditions which are detrimental to public health, then Congress may be induced to make the necessary provision for carrying forward the work. But we have no fund from which this salary may be paid at present, hence as a temporary expedient I recommend that a committee of two, one of whom shall be a resident of Washington or of its immediate vicinity, be appointed to take up this important matter and accomplish what is possible under existing conditions, and make definite report to our next annual session with recommendations.

STATUS OF THE ARMY AND NAVY DENTAL CORPS.

By an act of Congress, approved March 3, 1911, and another approved August 22, 1912, the nondescript and odious "contract" position of our dental representatives in the army and navy has been removed, and a grade of regular military rank common to all staff corps is accorded. The naval bill reads that—

"Appointees shall take rank and precedence in the same manner in all respects as in the case of appointees in the medical corps of the navy"; that "All officers of the dental corps authorized by this act shall receive the same pay and allowances as officers of corresponding rank and length of service in the medical corps of the navy, and shall be eligible to retirement in the same manner and under the same conditions as officers of the medical corps of the navy."

For ten years or more we have been striving for this small measure of justice, not for any personal or professional aggrandizement, but in order that our *confrères* in the service of the army and navy may have by legal right that social standing and rank to which their culture and training entitle them, and that the learned profession of dentistry may not be brought into disrepute by the intrusion of the "dental hobo." We certainly have reason to congratulate ourselves that so much has been accomplished, and that the agitation of this matter in Congress has awakened an interest, and has won to our cause the friendship of many prominent and influential men—all of which augurs well for future legislation that shall give us in full measure the standing we merit.

All honor is due to the present Legislative Committee and to all of the legislative committees who have labored so assiduously during the past years for this cause, and I take this opportunity of acknowledging my indebtedness to and expressing my appreciation of the untiring efforts in behalf of national dental legislation made by Dr. Wms. Donnally, to whom more than any other one man we are indebted for the passage of these acts by Congress; for, whether as a member of the Legislative Committee or in co-operating with it, his interest and unselfish devotion has never waned, and no sacrifice of time, money, or personal discomfort has been too great for him.

LEGISLATIVE COMMITTEE.

I feel that it is very important that the Legislative Committee for the year 1912–13 be appointed at once, in order that they may keep in touch with the operation of this act, and render such assistance from time to time as may be helpful to those in authority.

The work is too burdensome and expensive for the ordinarily constituted committee, therefore I recommend that this committee be authorized to accept and use contributions at its own discretion.

MEMBERSHIP IN THE N. D. A. URGED.

The rapid development of our profession during the past decade has been so fully treated by essayists in recent years that I find little to add that is new. I do feel that the great meetings we have held—unwieldy though such an assemblage necessarily is—have been conducive to great good for the profession at large. But it is a matter of surprise and regret to me that so many good men, eligible to membership, attend these sessions and partake of all the benefits, and yet do not feel constrained to assume their share of the responsibility by joining the National Association and helping us to the extent of their annual dues at least. This would be to the individual a mere pittance, but in the aggregate a sum that would enable this body to carry forward scientific work by trained specialists, which would add yearly to our definite knowledge and efficiency, and

place us in the front rank among the world's great scientific bodies.

PLEA FOR UNSELFISHNESS AND FRATERNAL CO-OPERATION.

I rejoice to see a feeling of fraternal kindness and co-operation becoming more and more apparent, thereby displacing the selfishness and jealousy which have been so conspicuous in our profession in the more distant past. In many localities dentists are experiencing the joy of co-operating with other men engaged in the same general work—the idea of mutual interests and mutual helpfulness is growing. In this great country, with its varied climate and diversified interests, we must expect great differences of opinion. But the underlying principle of truth, honesty, and fair dealing between man and man are the same in frozen Alaska as they are on the sun-kissed shores of Florida, and the heart of a true man is as true in one section as it is in another. Shall we not then catch the true vision, a broader vision of the possibilities of this great national dental organization, and, putting aside all selfish desires and aspirations, resolve that henceforth we shall lend ourselves and our energies to the highest and best. I fear we do not fully realize how even a little friction retards progress. We recognize this truth in mechanics, and, at the slightest hint of friction, hasten to apply oil that the machinery may run smoothly and accomplish its function without wear or waste; yet in greater matters of professional uplift and progress, in which we are vitally and equally interested, we are often unwilling to yield to the judgment of the majority. Or, if our particular friends are not among the chosen leaders, we withhold our co-operation and support. In doing this we are giving way to the selfishness in our natures; we are becoming narrow-minded personally, and to a degree hinder the very cause we would advance, and which it is to our personal interest to advance. I want to see every dentist in this fair land of ours turn his back upon all such selfish action, and experience the joy of living upon a higher plane, of putting aside all petty, personal differences, and of uniting in a determination to make the profession of dentistry second to none in honor and scientific attainment.

Modern Dentistry in Germany.

By N. S. JENKINS, D.D.S., Loschwitz, Dresden.

IN response to the flattering request of your president, I beg to present a few observations upon Modern Dentistry in Germany, as being a subject of especial interest at a time when our profession is everywhere exercising so wide an influence and attaining such great importance.

The characteristics of every nation are displayed in its contributions to science. No one people has a monopoly of research, of clear deductive reasoning and of practical application of knowledge, but each works in its own way according to the inspirations or the limitations of its temperamental, social, and educational conditions, and the combined results of all are for the enlightenment and the healing of the world. Just so far as the nations "foremost in the files of time" understand each other, so far is advanced the doom of narrow jealousies, the growth of mutual admiration and respect, and the triumph of the arts of peace over the arts of war.

EPISODES IN THE DEVELOPMENT OF MODERN DENTISTRY.

"Modern dentistry" is not quite easily defined. It does not simply exist in Miller's epochal explanation of a rational theory of dental caries, nor in the prodigious growth of technical devices, which have so greatly aided in developing prosthesis and orthodontia and made the restoration of lost dental tissue by porcelain and gold inlays a comparatively easy task. Neither does it consist in the discovery of general and local anesthesia, through which the sufferings of patients have been so largely ameliorated and the field of conservative operations has been so widely extended; nor in the revelations of the Roentgen ray; no, not even in the splendid triumphs of bacteriology, whose contributions to our knowledge and resource are but an earnest of what is to come. All these, and much more, are but episodes in a development so fundamental, so rapid, so practical, so wide-reaching, so beneficent, so inspiring, that the observer from the former generation can but exclaim, "Behold, all things have become new!"

THE STATE UNIVERSITY AS THE CRADLE OF MODERN GERMAN DENTISTRY.

In Germany, modern dentistry may be said to have had its beginning with the foundation of dental institutes in 1884, at the Universities of Leipzig and Berlin, the year of the twenty-fifth anniversary

of the Central Verein Deutscher Zahnärzte. This beginning was the result of a long campaign patiently and persistently waged by the early German dentists who, loyal to their traditions, believed that true progress could only be made through establishing university schools. In America, where, as the Carnegie Foundation for the Advancement of Teaching asserts, a large number of private medical schools still exist, and where the first college of dentistry was obliged to become an independent institution and wrought its great work without connection with a university, this steadfast conviction may not be perfectly understood.

In Germany the whole system of education is under the control of the state, and constitutes a pyramid of which the university is the apex. For five centuries it has been a citadel of the "republic of letters." Born at the close of the middle ages, flourishing under the emancipation of mind in the Reformation, surviving the thirty years' war as almost a unique example of what was best worth preserving out of that disastrous struggle, nourishing a love of liberty from the beginning of modern history, keeping alive the national spirit in times of deepest political and military humiliation in full hope of ultimate triumph, the university has continuously cherished and displayed the best qualities and gifts of the German character. The universities have been the hope of the people. Any German, however humbly born, might hope to become, if gifted and industrious, a learned man, and might even aspire to become a professor, one of the few positions which indicated personal worth and not favor.

With each step in emancipation from the foreign yoke, every little state became ambitious to have its own university, as the sign and symbol of the higher intellectual life and the means of exalting its own importance. Not only has the university been the source of training from which have sprung a splendid literature and renowned philosophies, but out of the universities, and their kindred technical schools of equal rank, have come the triumphs of German science and the wonderful achievements of German medicine.

It was therefore inevitable that there should have seemed to our German colleagues but one way to found schools of instruction for dentists. The state, and the state alone, would be sufficiently wise, disinterested, and powerful to supply the appropriate instruction and to regulate the conditions under which it should be given. It could only be through creating a new department in the universities, by adding three sections to those already existing; and thus would be developed a new branch of medicine. To convince the authorities that such schools were necessary was a long task, and when at last they were reluctantly convinced, their response was not immediately impetuous. It was the theory that a dental institute should be organized and supported by the state, but this was not at once accorded. The earlier institutes were organized by instructors appointed by the state and who generally received the title of Professor, together with a small subvention. The beginners were obliged to content themselves with modest facilities and to exercise the most rigid economy in order to make their meager supply of money go as far as possible; but they were men of determined character, patient, unselfish, hopeful. Tomorrow was to be theirs. They were striving for full recognition and generous support, and were not to be discouraged if the way

were long, for they knew their system was founded upon the true interests of society and consistent with the cherished methods of education.

Leipzig affords the best example of the slow but certain progress toward the desired result. At first the dental institute was only slightly attached to the university. It required fourteen years, from 1884 to 1898, before it was finally taken over by the state and incorporated into the medical faculty. All the dental institutes in Germany have gone through, or are at present going through, the same process, and three of them, Leipzig, Würzburg and Berlin, have at last obtained splendid new edifices, which are among the best examples of convenience and appropriateness of arrangement and are built in the lordly way which characterizes German governmental undertakings. The theory has been that every dental institute should have three departments, namely, surgical, operative and technical, each with a professor at its head and with the necessary number of assistants. As yet, however, only four institutes conform to this ideal—Berlin, Breslau, Munich, and Leipzig, and in Leipzig the surgical and operative departments are temporarily united.

But the long battle has been won. In a condition of greater or less development, the dental institute has found a home in the German universities. Recall these universities in the order of their seniority, from 1396 to 1872—Heidelberg, Würzburg, Leipzig, Bostock, Tübingen, Greifswald, Königsberg, Jena, Giessen, Kiel, Halle, Göttingen, Erlangen, Münster, Berlin, Breslau, Bonn, Munich, Strassburg. What a majestic roll! What memories of ancient learning, of courageous seeking for light in abounding darkness, of creations of spiritual and material beauty, of the diffusion of enlightenment and the relief of human misery come to us in the mere mention of these great names! Dentistry is now adding to their glory. What a triumph for our young profession that in all of them but two, dentistry has found an abiding-place and has opened a new chapter in its history.

EDUCATIONAL REQUIREMENTS AND CURRICULUM.

Has German dentistry been, and will it continue to be, worthy of its opportunities? From the first a standard of preliminary education equal to that of graduation from one of the best of our high schools was demanded for matriculation, but three years ago the government raised the standard to the passing of the maturity examination of the gymnasium, as is required for commencement upon the study of the other professions in the university. At the same time the course was extended from six to seven semesters, three less than is required for the medical degree, and equal to three and a half years, before the dental student could be graduated. The course of study is severe and the requirements are not to be evaded. All students must begin with work intended to train the hand. During the first two semesters, besides devoting themselves to physics, chemistry, anatomy, physiology, and lectures upon prosthesis, they must work seriously in metals and at carving in ivory, then in metal plate work and only last at the simpler technique of vulcanite. At the end of the year they must pass a thorough examination, or be set back for half a year. Throughout the whole course, which increases in demands with every semester, the students are kept closely occupied,

and yet, so eager are they to make the most of their opportunities, that many of them find time for attendance at the lectures and clinics upon subjects in the extensive borderland of dentistry.

The advantage of accepting only students who have ripened and systematically trained minds is very great. Such students more quickly master the principles and more readily acquire the necessary dexterity in practical work than those of inferior discipline, in spite of their more advanced years. Physicians who turn to the study of dentistry not too late in life, often display remarkable ability in practical work. Women, who constitute perhaps ten per cent. of the students, seem to possess even more patience, industry, and ambition than the ordinary male student, and they usually pass the final examination with especial credit in the theoretical and scientific branches. They have proved to be, by reason of their patience, gentleness, and conscientiousness, peculiarly adapted to the trying work of the school dental clinics, and will doubtless play an indispensable part in the development of this immensely important work.

PRESENT NUMBER OF GERMAN DENTISTS.

In 1883 there were in Germany only four hundred and fifty-one dentists who had passed the examination of their time. There are now between three and four thousand well-educated practitioners, who are for the most part doing excellent practical work, and some of them are exceptionally able operators.

PERSONNEL OF TEACHING STAFFS.

It was inevitable that the German dental institutes should, from the beginning, lay great weight upon fundamental scientific training. It was not their business to make merely skilful operators; that could be done with uneducated men. Their task was to raise dentistry to a learned profession, to place upon the graduate a hall-mark of which he should be proud, to fit succeeding generations of dentists to be equal to the emergencies of their time. In their task they were aided by American experience. Some of the instructors were American graduates, among whom the revered Miller was the light, not of Germany alone, but of the world. It was, however, only among themselves that they could hope to find the men permanently adapted to their purpose, and these have been found by the natural process of evolution. In every direction their influence is great.

POSTGRADUATE COURSES.

An interesting example of the way the state and dental instructors may work together for good is found in the establishment of the postgraduate course in Berlin ten years ago. It was felt that the progress of dentistry was so rapid that the older practitioners were in danger of being left behind, and therefore it was determined that a school should be established, partly supported and directed by the state, to afford such practitioners gratuitous opportunity to become acquainted with modern theories and methods by lectures and thorough instruction in practical work. This school was established in Berlin and continued holding two courses in the year, one in summer and one in winter, of from four to six weeks each. Its usefulness was so evident that it was found necessary later to extend its work by establishing local courses of six days each in the smaller towns of Prussia.

The order and efficiency which characterize this enterprise, and the unselfish devotion of the eminent men who have taken part in it, are beyond all praise.

REMARKABLE PROGRESS OF PUBLIC DENTAL HYGIENE.

Perhaps the most striking illustration of the influence of modern German dentists is found in the progress of public dental hygiene during the past ten years. The first school dental clinics were established in Strassburg and Darmstadt in 1902. There are now one hundred and twenty clinics in Germany where the children of the people can be treated, and this is but the beginning in a campaign designed to revolutionize the physical and moral condition of the nation. It is a stupendous task, but it is being carried out logically and progressively. It seems indispensable in Germany to undertake any great work only upon a definite plan founded upon a plausible theory. In this case the theory is that the municipality, which has charge of the lower schools, owes it to the state to care for the teeth of poor children. Experience shows that this can be done more effectively and more cheaply in this country—where politics is absent from municipal government, and where none of the public money is lost or squandered—through the municipality rather than through private means. Of course there are here, as elsewhere, differences of opinion. There are some jealousies and much ignorance and inertia to be overcome, on the part of the magistracy as well as on the part of the people, but the theory is sound, the devotion of its champions is heroic, and complete ultimate triumph is inevitable.

GERMAN DENTAL LITERATURE.

Germany is particularly rich and prolific in dental literature. The German temperament and education leads naturally to research and to literary expression of a high order, which is aided by the richness and flexibility of the language. The last quarterly report of a Berlin publisher announces some twenty-five new dental publications, all of them of interest and importance. I cannot too earnestly recommend American dental students to study German, and thus open for themselves access to a professional literature of great value. America would also largely profit were German dental works as frequently translated into English as American and English works are translated into German.

In Germany the dental professor advises and expects the student to pursue his course of dental study in more than one university, in order to broaden his vision and experience. This admirable custom should become international.

SPECIAL BRANCHES IN WHICH GERMAN DENTISTRY EXCELS.

The list of branches in which German dentists have made striking progress is too long for detailed mention. In every department of oral surgery they are superb. They are famous in the surgical treatment of chronic periodontitis and for the replantation of teeth which have had chronically diseased roots. This latter is a common operation among German dentists, even in small circles of practice, and is attended generally with favorable results. In local anesthesia, regional and neural, founded upon minute study of the anatomy of the jaws, they are unsur-

passed. In the technique of Roentgenology, intra and extra-oral, and in the resulting correctness of diagnosis in abnormalities and diseases of the teeth and jaws, they are unequaled. They have improved the systematizing of orthodontia and cultivated a sounder judgment in this field by their studies in etiology, and made great advance in bringing into place unerupted teeth by surgical and orthodontic means, and they have also greatly advanced the surgical prosthesis of fractured jaws. They have improved the technique in casting inlays and bridges, as well as in making porcelain inlays. They have refined the methods of local operative treatment in pyorrhea, and invented ingenious and practical methods of splinting teeth loosened by this destructive disease. Their researches in oral bacteriology and their investigation of such subjects as the relation of the thyroid gland to the development of the teeth are indications of the sort of work especially congenial to the mind of the German scientist, and in which he achieves such great results. It is partly temperament, partly education, partly social conditions, from which the German derives this characteristic ardor for abstruse investigation. He loves the pursuit of knowledge, not simply because it brings power, but also because of the richness and splendor which it gives to life.

EXCHANGE OF TEACHERS URGED.

American intellectual activity, with its strong bent toward immediate practical results, is likewise affected by environment. The direction of our achievements has been determined by the necessity of redeeming a vast continent from savagery and preparing it for a new type of civilization. The German asks, What does a man know? We ask, What can a man do? We greatly need to more completely understand each other. In dentistry, as in other branches of learning, we should establish an exchange of professors for mutual enlightenment and advantage.

MEDICAL COURSE FOR DENTISTS UNPOPULAR.

In Germany, as in America, there appears to be no general enthusiasm for insisting upon a full medical course for dentists. It is believed that the system of instruction is now so broad and thorough that the three extra semesters required for the medical degree are not essential. It is, however, felt that a special Doctor title should be given to dentists, as is the case in America, and this desire will probably soon be fulfilled.

STATUS OF AMERICAN DENTISTS IN GERMANY.

There are, of course, some perplexing questions which may long remain unsettled. There are some hundreds of German dentists who are practicing under American diplomas, as well as a small body of native American dentists to whom the law also permits practice without passing the state examination. Owing to the widely differing qualifications which obtained in America in former years, and the abominable activities of the bogus colleges, the regular German graduates have been unable to decide how far to recognize even their own countrymen who bear American degrees, leaving the whole matter largely to personal preference. The result has been that many of the German-American dentists have

combined to form a flourishing society for themselves and support a society magazine. The native American practitioners have some local societies and generally are members of the American Dental Society of Europe.

THE PROBLEM OF THE PRACTITIONER WITHOUT DIPLOMA.

But a much more troublesome question is the position of men who, from being at first laboratory workmen, have come to practice every branch of dentistry. The technical skill of these men is sometimes considerable, and they, as is the case with a similar class in England, outnumber the regular practitioners. Germany has been so long developing her system of dental education, that these men have naturally sprung up to supply a demand, and they cannot be legally deprived of their means of livelihood. How they shall be educated, assimilated, or eliminated is a problem of a very complex nature. Possibly American experience may contribute something to its solution, but more probably only purely German patience and understanding and rectitude can find a fitting way.

A PERSONAL TRIBUTE.

I have purposely refrained from complicating this sketch with references of a personal nature, not even mentioning some few of the names of the distinguished men who have advanced German dentistry. I have wished only to present to my American brethren a panoramic view of the condition of our profession among a people with whom my active life has been passed, from whom I have received unending kindness, and whom I admire and love next only to those of my own blood.

What the Government is Doing to Prevent Diseases.

By M. C. SMITH, A.M., D.D.S., D.M.D., M.D., Lynn, Mass.

WHAT is our government doing for the health of the people? Probably few have any idea whatever of the magnitude of the work being done along those lines by the government. This subject is difficult of access, since the work is being carried on under practically every department of the government, but especially under that of Agriculture.

When I first began to think about writing this paper, I wrote to our representative asking whether it would be necessary to come to Washington to look up the matter. His reply was: "No, I shall send you some of the reports," and he sent me over 20,000 pages of printed matter—and in all this not a line from the department of Agriculture.

This will give you a small idea of what is being done by the different departments.

VARYING VIRULENCE OF DISEASES.

All civilized governments consider it wise to know something about diseases peculiar to foreign countries, so that in case diseases should be imported they may have a working knowledge and be the better able to combat them. Again, some mild diseases, when transplanted to other soil and in a different environment, become much more virulent; the black man's disease, for instance hookworm, is an altogether different disease in the white man. The black man, having been subject to that disease from long exposure lasting probably for untold generations, has developed a certain amount of immunity to contagion; but when this disease is transplanted into soil where there is no immunity, it assumes a more virulent form. The white man's diseases—tuberculosis, measles, smallpox, and others—when transplanted to Indians, have a like result. It therefore behooves all governments to look well to the milder forms of infection, which may change their nature at any time, and become a menace to the country to which they migrate.

The destruction of the Roman empire has been attributed to the invasion of the barbarian hordes from the north, but, had not the life of the Romans been poisoned by malaria injected into their veins by the mosquito, they would have been able to rally to the defense of their country. Not until the Italian government, armed with a knowledge of the life-cycle of malaria, began to fight the mosquito, did the Italian people advance with the strides we see them taking at

the present time. North Africa was at one time a populous country compared to what it is today. Is the reduction of population due to intestinal parasites or to soil bacteria?

DUTIES OF THE PUBLIC HEALTH AND MARINE HOSPITAL SERVICE.

Our government has seen the need of being acquainted with such diseases before they make their appearance here, and consequently it has established outposts at which they can be studied, and is keeping a lookout for those that are already within our bounds. That work is done under the head of Public Health and Marine Hospital, presided over by Surgeon-general Rupert Blue, who is assisted by 444 medical officers stationed throughout the United States and foreign countries. To this department the general public health is intrusted; it co-operates with and assists the health authorities of the individual states; collects statistics on the prevalence and geographic distribution of disease, suppresses epidemics, investigates infections and epidemic diseases, maintains the national quarantine and the examination of immigrants, regulates the manufacture and sale of vaccines, serums, and antitoxins, and furnishes medical service for various branches of the government service and for the sailors of the merchant marine.

HEALTH MEASURES ON THE PART OF THE AMERICAN CONSULATES.

The American consuls throughout the world report weekly the number of cases and deaths that have occurred from contagious diseases in their districts. Whenever cholera, yellow fever, or plague breaks out, it is reported by cable, and ships coming from those ports are closely watched. The American consul has considerable power; no ship can leave a foreign port bound for any port in the United States without having its clearance papers signed by the consul, giving it a clean bill of health, and in case an outbreak occurs after the ship has left port, that fact is immediately cabled to the government.

THE YELLOW FEVER EPIDEMIC IN NEW ORLEANS, 1905.

A good illustration of the method and the usefulness of the work done by the government was furnished in the outbreak of yellow fever in New Orleans in 1905. When the disease got beyond the control of the local government, they appealed to the Federal authorities, who took charge of the situation. They began at once to attack the disease from all quarters. At that time the full life-cycle of yellow fever was known. The patient was screened to prevent the mosquitos from becoming infected; the breeding-ponds of the mosquito were destroyed, or screened when practicable, to prevent the adult mosquitos from laying their eggs. In this way the disease and the carriers of the disease were successfully fought.

THE PLAGUE EPIDEMIC IN CALIFORNIA.

Again, when plague broke out in California, the public did not realize that rodents were the intermediate hosts of the disease. Since the local boards of health were unable to rise to the emergency, the government's men had to take charge; they found a herculean task upon their hands, but at once they realized that

the ground squirrel as well as the rat was a carrier of the disease. When we consider that square miles of the waterfront of San Francisco were built on piling, over the water, that many of the streets were paved with planks, that it has a mild climate, and is a port for the exportation of grain—where could a more ideal environment exist for the home of the brown rat? And only an eyewitness can form any idea what the squirrels on the plains around Contra Costa meant; they were there by the millions, and only an expert marksman was able to kill them. When the government realized, however, that the ground squirrels were infected, and in some places found their hutches literally filled with dead ones, the farmers suggested to let the disease spread, for it would kill their pest—the squirrel. But the squirrels did not all die; some recovered and became living carriers of the disease. The government therefore selected an area of land five miles wide and far from the infected district, and determined to thin down the squirrels on that area to such an extent that they would not be able to carry the disease to other colonies. It also determined to destroy the rat in San Francisco by attacking it from all quarters, cutting off its food supply, destroying as far as possible its habitation, catching all they could, and poisoning all that would eat poisoned food; and they succeeded in practically exterminating the rat from that infected area. If the government accomplished nothing more than to demonstrate that the rat can be exterminated, it did a work which paid many-fold for all the expense incurred.

Two well-equipped laboratories are being maintained—one at San Francisco and the other at Seattle—where a special study of plague is being pursued to ascertain if other animals than the rat, ground squirrel, and mouse are hosts of this disease. It is very well-established that in America the flea is the carrier of the disease from the rodent to man; in other countries, especially Central Asia, there are other avenues of infection. The wild duck, for instance, seems in some way to be connected with the life-cycle of plague.

REGULATION OF THE MANUFACTURE OF VACCINES.

The Public Health service regulates the manufacture and sale of all vaccines, diphtheria antitoxin, tetanus antitoxin, and similar products sold in interstate traffic or imported from abroad; it examines these products as to purity and standard, inspects the manufacturers' plants, and if they are satisfactory, issues a license for one year, at the end of which time another examination is made.

Ophthalmia neonatorum. This department is also trying to enforce a uniform method of treatment of ophthalmia neonatorum, by the use of a standard solution of one of the silver salts, with which the eyes of the newly born are washed, thus practically doing away with blindness in children.

QUARANTINE REGULATIONS.

Probably you are all familiar with the quarantine regulations. The port physician comes on board of incoming vessels to examine everything, from the bridge to the keel; it is his privilege to say who shall land and who not; his word is law. The government's intention in establishing the quarantine was to prevent disease from being imported into this country.

Besides the port physician, medical men are assigned in practically all the large cities of the world to inspect passengers coming to this country, and in districts where special diseases exist, extra men are stationed. For example, favus and trachoma from Europe, yellow fever from South America, cholera and plague from Asia are specially watched for. On its frontier the Russian government has established detention hospitals where emigrants are kept under observation for a number of days before they are given a clean bill of health. Those bound for the United States are under the care of our own medical officer. The ports of the Mediterranean have been guarded of late for cholera. The Isthmus of Panama has been especially guarded since the outbreak of yellow fever at Guayaquil and other South American ports. All of the Panama ports and plantations are watched for outbreaks of any contagious diseases which might be exported with the fruit. In case of an outbreak of any disease on board a ship bound for a port in this country, the machinery of the quarantine department is immediately set in motion, and if the facilities at that port are not adequate to handle a large number of immigrants, which is rarely the case, the ship is sent to some port where the facilities are adequate. Owing to such watchful care, very little disease has been imported.

The quarantine is the medical watchdog of the country, whose mission it is to keep out disease. Such prevention is often much easier than it is to eradicate disease after it has once gained a foothold in the country. This is well illustrated by our present epidemics of smallpox, which seem to break out when least expected, all over the country, and which, with the lax enforcement of our vaccination laws, it seems impossible to eradicate. Still, our quarantine must be on the alert for any new importation of that disease, especially as that form of it which is already in our country is of a very mild nature and shows a low death-rate, while the form which is prevailing elsewhere is of a much more virulent nature and shows a vastly higher death-rate.

MARINE HOSPITALS.

The government maintains 23 marine hospitals and 118 marine hospital stations, where during the last fiscal year over 52,000 patients received treatment. At nearly all of these stations provision is made by which, in case of an outbreak of disease nearby, men can be dispatched to do research work and to study the disease under its most favorable environment. When the government wanted to study typhus fever, a man was sent to Mexico, where the disease was prevalent, and through this investigation it was clearly proved that the body-louse—*pediculus vestimentorum*—was the carrier of the disease. Whether there is an intermediary host was not quite proved, but probably the cycle was one from man to louse and from louse to man. Later it has been shown that the head-louse can also carry the disease.

AMERICAN OBSERVATION STATIONS AT HOME AND ABROAD.

The government supports a tuberculosis sanitarium in New Mexico, where the most scientific treatment of the disease is afforded the patient, under ideal climatic and sanitary conditions.

In the Philippines beri-beri has been receiving special attention, and some

progress has been made; for while it has not yet been ascertained just what this disease is, it has been demonstrated that, with a diet of less polished rice and more animal food, the disease has practically disappeared from the native soldiery.

While the station at Panama is primarily intended for watching for contagious diseases that might cross the Canal zone in either direction from South America, the hospitals and laboratories at Ancon and Colon are busy with research work, especially on trypanosomæ or sleeping-sickness diseases. One important fact has been demonstrated that in the passage of *trypanosoma gambiens* through guinea-pigs, the virulence is increased, while in the trypanosoma of Togo the virulence is diminished. That is a very important point, and may mean that a serum for immunizing against sleeping sickness will be available.

Few realize the amount of laboratory work that is being done at Ancon hospital. During the month of June there were 1335 blood examinations made, principally for malarial parasites; also 1354 stools were examined, principally for intestinal parasites, with the object of protecting the country from a fresh invasion of intestinal parasites, brought home by a returning employee of the Canal commission. Rabies has also been exterminated in the Canal zone, and, if we consider the number of dogs kept there, the result was undreamed-of.

CESSPOOL SANITATION.

One of the greatest works that have been undertaken by the government was delegated to Dr. G. W. Stiles, professor of zoölogy. It was his mission to devise and construct a sanitary privy, and one at the same time cheap enough to be available by the poorest and humblest of people living in the rural districts. The ordinary privy, if one exists on the farm —and it is safe to say that on the average in all the states not half of the farms have a privy—is of rather poor construction. Frequently, if any attempt at all has been made to clean out the droppings, they are tipped over at almost any angle. The seat is often split, the back part is open—rather an unsanitary picture. Privy accumulations are the ideal breeding-places for flies, typhoid, hookworm, amœbic dysentery, Cochin China diarrhea, and other zoöparasitic diseases, while the ground under and around becomes impregnated with the fluid contents of the privy vault, furnishing an ideal breeding-ground for many parasites injurious to animal and man. As the privy is frequently close to the well, the drainage from the vault to the water supply of the well is soon established. The flies that breed in the accumulation may not be disease-carriers in the sense of being part of the cycle of any particular disease, but they can carry many bacteria on their feet, and as they generally make three daily visits to the kitchen, is it any wonder that disease is rampant during the breeding-time of flies? Dr. Stiles has spent much time on devising a sanitary privy, in the form of a deep, water-tight, dark, and fly-proof tank. The droppings are collected with the urine, and the fermentation that is constantly going on in hot weather soon destroys all micro-organisms, spores, and eggs. Experiments have also been made with disinfectants and cultures of yeast. The privy covers all requirements of safety, and requires a minimum amount of care to be kept clean; still the first cost may be some obstacle to its general adoption.

Nothing is too small for the government to investigate, for full reports are made out as to how to kill fleas scientifically and cheaply, how to kill mosquitos and ticks, or any other parasite that attacks man or beast.

LEPROSY INVESTIGATION STATION AT MOLOKAI.

At the leprosy investigation station at Molokai the cultivation of the bacillus lepra on artificial media has been accomplished. An acid-fast bacillus has been grown on artificial media and a pure culture obtained. This means much to our country—as we are surrounded by so many points of infection and so many sources from which the disease can be imported, besides having several foci of disease within our own bounds, it was quite a question what was best to be done. Now, since it is possible to make a positive diagnosis by the culture of bacillus lepra from the patient, and with the use of chaulmugra oil, the disease is losing much of its horrors, and I trust that the scene that was enacted a few years ago, of shutting a supposed victim of leprosy in an open freight-car and shunting him from one state to another, will never be repeated in this enlightened land. Clegg, at Manila, was the first to grow the *bacillus lepra.*

PELLAGRA INVESTIGATIONS.

At the marine hospital in Savannah, special work is being done on pellagra, a disease that is assuming an alarming aspect, as it is spreading rapidly and shows a very high mortality. In 1909, Past Assistant Surgeon Lavender was sent to Italy, and in association with men from the London School of Tropical Medicine he made a most exhaustive study of the disease where it seems to have originated. These investigators, however, were not able to decide to the satisfaction of all just what this disease is, the Italians holding to the idea that it was due to the use of diseased corn as an article of food, while the English and Americans are inclined to the belief that it is either due to a parasite of a protozoal nature, conveyed by some blood-sucking insect that acts as an intermediate host, or to a water-borne trematode worm, genus *Filaria.* Whatever the etiology of this disease be, when it can be clearly proved how it originates and how it is carried to the human body, a great advance will be made in the method of treatment, but before this is demonstrated, we cannot expect much success in the treatment.

SPOTTED FEVER INVESTIGATIONS.

A special work has been done in the Bitter Root Valley, Mont., on spotted fever. After the conviction had been gained that the tick was the carrier, dipping tanks were built and all domestic animals that were habitats of the tick were dipped in an arsenical solution to destroy the tick, while wild animals were killed.

INFANTILE PARALYSIS.

Poliomyelitis, or infantile paralysis, seems to baffle all attempts at establishing its identity. Despite the gigantic work done by the several state boards of health, especially that of Massachusetts, assisted by the various district boards and backed up by all the machinery of the Federal government, it is still a mystery how this disease is communicated to man. While its etiology has not been established, much progress has, however, been made in the treatment of this disease. It now seems to be due to a dust-carried source of infection; if, on the

other hand, it be insect-carried, the fragrant bed-bug is most probably the offender.

"EPIDEMIC FUND."

The annual law passed by Congress appropriating the "epidemic fund," contains a provision that the appropriation may be used in aid of state and local boards of health in enforcement of their quarantine regulations, as well as for the national service—said appropriation to be used, however, only in the fight against certain specified epidemic diseases, viz, cholera, yellow fever, smallpox, typhus fever, and bubonic plague. On the appearance of any of the above-named diseases, if any state requires it, the officers of the Public Health service are at once on the scene. When aid is extended, the government's funds must be expended by its own officers, and the latter are placed in charge, with the co-operation and assistance of the state and local laws and regulations.

The Public Health service may be found in the states investigating other diseases than those named in the epidemic law, viz, typhoid fever, infantile paralysis, cerebro-spinal meningitis, hookworm disease, pellagra, dengue fever, milk-sickness, etc. These investigations are generally made at the request of the state health authorities.

Much work is being done by other departments, in the line of pure food, pure drugs, etc., all with a view toward the conservation of our natural resources and the health and comfort of mankind.

SCOPE OF THE FEDERAL GOVERNMENT'S WORK.

The cardinal duties of the Federal government in conserving the public health are, first, the prevention of the introduction of contagious and infectious diseases from without, as well as their spread from one state or territory to another; second, the investigation of communicable diseases, the conditions favoring their spread, and the measures necessary for their prevention; third, the dissemination of sanitary information thus acquired; and fourth, co-operation with state and local authorities for the protection of life and health.

Without question, it is the right and duty of the general government to engage in the most thorough scientific investigations, to collect all possible statistics, and to publish broadcast important sanitary and hygienic information. Specialists have been and are being developed on various subjects, such as typhoid fever, pellagra, hookworm disease, infantile paralysis, scientific disinfection, etc.

The research work carried on during the past year included tuberculosis, with special reference to the blood and transmission of the disease by milk; typhoid fever and hookworm disease, the longevity of their causative agents, and the means necessary for their destruction in nature; typhus fever and its transmission by the body-louse; pellagra; infantile paralysis; cancer in the lower animals; the "straw mattress disease"; immunity; the oxydases, with reference to their defensive action in the animal body; the influence of bleaching on the nutritive value of flour; therapeutic properties of the thyroid and suprarenal glands and the commercial preparations of them. Investigations including viruses, serums, and toxins used in the treatment of disease are made, and standard units are prepared for anti-diphtheric and anti-tetanic serums. The identification of the animal parasites of man, also rabies, and

the administration of anti-rabie treatment, are also being studied.

CO-OPERATION OF THE DEPARTMENT OF AGRICULTURE.

The department of Agrieulture has been doing a great amount of research work along many lines. Anthrax, one of the older European diseases of cattle, has made its appearance many times in America, but it has been stamped out wherever it has made its appearanee among cattle. For some time, however, it has been appearing in sporadie cases in man, and in some localities quite frequently. Oeeasionally a ease of anthrax in man simulates an alveolar abseess, and any young practitioner might make the mistake of diagnosing a ease of anthrax as an alveolar abscess, and telling the patient to go home and wait another day —which delay would be fatal.

Sheepdogs imported into New York are kept in quarantine, and their feees are examined for tapeworms and other intestinal parasites. They are found to be largely infested with a tapeworm that inhabits the intestines of the dog and completes its life-cycle in the embryo state in the brain of the sheep, producing a disease called "gad."

Malta fever found in goats has been eleared up and proved to be a trypanosoma that can be communicated to man through the medium of milk. An outbreak has recently made its appearance in Texas, and a special commission is to be sent there to see what can be done to eradicate the disease.

Actinomycosis has been fairly generally reported from all over the country, and is now classed as a reportable disease. Any person sending pus to the state boards or to the government is assisted in making a diagnosis, which is of inestimable value for the dentist, who is thus made aware of the true eondition existing and ean take precautions to proteet his patient from extension of the disease to the lung, where it assumes a form which is often mistaken for tubereulosis, and which when onee established is fully as fatal.

CO-OPERATION OF THE BUREAU OF ENTOMOLOGY.

The bureau of Entomology has not been idle. They have worked out the "browntail" rash, and the disease similar to tubereulosis of the lungs, due to the irritation from the fur of the browntail moth.

Poisonous plants are carefully studied —*i.e.* those which are poisonous to animals, and through animals to man. Some plants are poisonous to animals, such as the loeo weed, but man in partaking of the flesh of animals affected with the loeo poison suffers no apparent harm.

I am indebted to the government reports and to the *Medical Times* for much of the information eontained in this paper.

Discussion.

Dr. W. W. Stockberger, department of Agriculture, Washington, D. C. I am not sure that at this juncture it would be advisable for me to attempt to say much on Dr. Smith's able paper. One of the primary objects, which I believe is well recognized as being essentially a deterrent in the progress of disease is proper nourishment, and, as we have about reached the time of day when we in Washington are accustomed to take nourishment, I should be standing in the

way of your best health if I prevented you from proceeding to that important function.

I am merely one of the many government officers who give some attention to the problems which you have just heard discussed. I am connected with that bureau which is concerned particularly with plants, and in the course of our studies we pursue some lines of work which enable us to point out to stock-raisers poisonous plants which may cause losses of livestock, and we work out methods of antidotal treatment. We are also concerned with the investigation of plants used medicinally, and are testing a large number of drug and related plants from foreign sources with a view to their introduction for cultivation in the United States. Time, however, will not permit me to go very far into details concerning that work.

Reference has been made to the "loco" work which we have been following for several years as a part of the study of the relation of poisonous plants to the serious livestock losses of the western ranges. The study of that disease has progressed to the point where we know that an alkaloid exists in the loco plant, but we are not sure that this alkaloid is the exact cause of the disease, since from the studies which have been made upon it, it has not been found to be particularly toxic. The investigation of a number of other plants believed or known to be poisonous to stock is in progress, and some of these are of importance in the study of human disease.

Although many of these poisonous plants deserve more than a few passing words, I shall dismiss that subject, and turn to another of perhaps closer interest to you. The United States annually imports several million dollars' worth of drug plants and crude drugs, and it is one of the aims of the department of Agriculture to develop the production in this country of such of these plants and plant products as may prove adapted to our climatic and economic conditions. Furthermore, attention is given to the domestication of certain of our wild native drug plants, many of which, like the golden seal for instance, are threatened with extinction.

Another point not covered by Dr. Smith, which I think would be of interest to you from a professional standpoint, is the work which we are doing on plants which yield aromatic or volatile oils. We have introduced in the southern part of the United States the cultivation of camphor. That, as you know, has a medicinal use and a very widespread application industrially in the making of celluloid and similar plastic materials. The production of camphor now bids fair to become a commercial industry, and this at a specially opportune time, I think, since the changing economic conditions in the foreign countries from which this product is obtained apparently point to a diminishing supply for the future. In the southern part of this country many plants occur which yield volatile oils, and at our testing station in Florida we are trying to bring under cultivation some of these plants which seem to offer future promise. Among the native plants which it is hoped may be profitably cultivated is the horsemint (*Monarda punctata*). This plant yields a volatile oil which in turn, gives a relatively high yield of that valuable constituent, thymol. This constituent is gaining importance, especially as it has recently been introduced with favorable results in the treatment of the disease known as hookworm. It is an old saying

that wherever a disease exists there is a plant in that locality which is a remedy for the disease. That seems particularly true in this case, because in the South, where this disease exists, there also exists the plant which contains a remedial agent.

I will not weary you with further details of our work, but wish to say that this is an important part of the work which our government is doing to improve the health and the conditions of existence of the people of this country. Through the introduction and cultivation of medicinal plants, and through the study and development of our native plants which contain valuable medicinal constituents, we hope to contribute to the progress of medicinal science, by adding to our knowledge of the sources of medicinal plant products or by rendering the supply of them more readily available.

You have doubtless already inferred from my remarks that we are not so much concerned with the treatment of disease as with the production of some of the remedial agents employed therein. Next in importance to the treatment of disease itself is the development of an available commercial supply of the drugs necessary for the treatment of disease. It is in this way, we trust, that this particular branch of the service is contributing to the development of medication in general as well as to the work of preventive medicine, to which so much attention is given at the present time.

I am especially gratified to note that this great association, which represents a *clientèle* so closely connected with the health and physical comfort of mankind, is deeply interested in reaching beyond the narrow lines of professional interest into the broader and more general lines of medication as affecting the welfare of the whole people.

Mouth Infections: Their Etiology

AND A

Consideration of What Effect They May Have on the Vital Organs and Other Tissues.

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FOLK lore, fiction, and the drama are replete with details of devastation of life, in epidemic form, during preceding centuries. The rapid decrease in population from this source has been far in excess of the decimation of the race from any other causes, including warfare and all natural disturbances. Today, we know that some form of pathogenic bacteria was the direct cause of all these countless plagues and scourges. It is difficult for us even to imagine the panic of fear, in those ages, when any infection appeared in a thickly populated district. Immediate flight from the abodes of men was the only sure protection from death.

During the past seventy-five years, science has brought to our view one by one the specific micro-organisms which are responsible for different diseases of this type. This is best illustrated by the great strides made in the effacement of epidemics throughout the civilized world. Death in a large proportion of those infected in such epidemics was rapid, and the subjugation of such scourges was an achievement which excited the admiration of everyone.

MODERN STUDY OF MICRO-ORGANISMS.

During the past twenty-five years the study of micro-organisms has shown that certain types of bacteria may exist in certain portions of the body in quantities not sufficient to produce immediate death, but capable of producing toxins. These bacteria may attack the structure of the heart, the lungs, the kidney, the liver, the spleen, the brain, the spinal cord, etc. As a result the infected individual may die some years later from nephritis, endocarditis, tuberculosis, etc., but the real cause of death has been the constant development of certain forms of bacteria from which the deadly toxins have proceeded directly to the most vulnerable vital organ.

Excluding pyogenic disturbances emanating from surgical or traumatic causes, invasions of such bacteria appear to be

limited to the intestinal tract, the naso-pharyngeal region and adjacent territory, and lastly to the mouth, from which source many of the infections of the previously mentioned regions have their origin. There are undoubtedly still many unknown parasites. It has only recently been discovered that many minute organisms are invisible even through our most powerful microscope. The last disease discovered—by Flexner—to be caused by a submicroscopic parasite is epidemic poliomyelitis or infantile paralysis. He says that all the known members of the class of submicroscopic organisms are disease producers. Miller in his great work on micro-organisms of the human mouth, first published in 1890, repeatedly dwells on organisms which he was unable to develop. His great work in this field only served to make him positive that there were many bacteria which remained to be discovered.

SUSCEPTIBILITY AND IMMUNITY TO BACTERIAL INFECTION.

At the present time it is commonly understood that the majority of known pathogenic organisms are constantly with us. It is impossible to find a mouth free from bacteria. Why they are harmless in the body one day, when perhaps on the very following day they may in the same person produce infection, is not thoroughly understood. It has, however, long ago been recognized that immunity is not due to any one cause, and this has made its study a very complex one. That the vulnerability of different people varies we well know. Certain people lose their immunity much more readily than do others. It is generally believed that differences in the character of the micro-organism have a strong bearing on the susceptibility of the individual.

At the present time we are reasonably assured that certain forms of bacteria which attach themselves to our bodies, and to surfaces like the mucous membrane of the mouth, defend these tissues from more injurious parasites striving to gain a foothold. Even where immunity does not exist, as has been demonstrated in certain infections, there must be an abrasion of the skin or mucous membrane before infection is possible. This barrier is overcome when certain insects, like the mosquito and the fly, inject the micro-organism directly into the circulation. Malaria, yellow fever, and other diseases are caused in this manner.

THE SOUND MOUTH AN EXTERNAL BARRIER TO INFECTION.

It is well known that under some conditions a perfectly healthy person may be the carrier of pathogenic germs and thus may become the means of infecting some person who is not immune. Flexner speaks of other factors which contribute to determine infection. He says:

> The period of childhood is especially characterized by a class of infections that depend upon imperfections in the anatomical barriers that are far more adequate in adult life. Many of the diseases that we associate with childhood—measles, scarlet fever, diphtheria, epidemic meningitis, and poliomyelitis—utilize the mucous membranes of the nose and throat to gain a foothold in the body, because they are notably vulnerable. Their crypts or depressions afford a lodging-place in which multiplication of the parasites can be effected. and the breaks in the epithelial covering constitute the first breach in the external defense which the parasites seek to and successfully do enlarge.

This argument will apply with even greater force to the unclean mouth with decaying teeth. The congested condition of the gums with accumulations of débris

as well as salivary calculi, exposed as they are to the dust contents of the air and fluctuations of temperature, tend probably to depress their protective powers to even a greater extent than the epithelium of the nose or throat. It is but a step for such bacteria to pass to the tonsils and the pharyngeal region. In fact, the greatest benefit to be derived, especially by the child, from frequent prophylactic treatment of the mouth is the ability to have at all times a reasonable physiologic mouth, and thus keep intact one of the greatest barriers to infection. This is by no means an easy lesson to teach even to the most intelligent of our patients.

For some years I have been attending a family residing in the suburbs. There was constant objection to bringing the children to the city for monthly prophylactic service, not on account of the expense, but because the mother feared possible infection to the children while traveling to and fro. On this account she never permitted them to ride in the cars in the city. It was so impossible for me to convince her of the prophylactic value of a clean mouth as a defensive agent to the infections she feared, that I felt compelled to request her to seek another practitioner.

PHAGOCYTOSIS AND IMMUNIZATION.

So far we have considered what are known as the external barriers to infection. These alone would be entirely inadequate to prevent the spread of many diseases of parasitic origin. There is a second line of defense, the internal, of much greater importance than the first, on the strength of which immunization is chiefly dependent. Flexner describes this as follows:

It consists of a group of substances contained within the blood, but not produced there, and passing from the blood into the lymph, where they exert influence on the cells composing the organs, and upon parasites in the interstices of the tissue. The chief site of the production of these protective and healing principles—immunity principles, so called—is the very place where the blood corpuscles themselves are formed; namely, in the bone-marrow, spleen, and lymphatic glands. The principles are divided into two classes of substances—one soluble and dissolved in the fluid plasma, and the other corpuscular and suspended in it; the latter consists of the motile white cells, or phagocytes—and together, in virtue of their soluble form and ready motility, they are able quickly to reach most parts of the body where their peculiar properties may be exerted. Not only are these immunity principles in action in all individuals, in whom they operate against intending infections, but they become rapidly increased when infection has been established; and the ultimate issue of the condition in spontaneous recovery or the reverse depends upon the degree of this response and the competence of the curative bodies evoked to reach and to suppress the infectious agents.

The normal body possesses, therefore, great potential power of resisting infection, and this power can be quickly raised. on demand, to a higher level, so as to ward off disease—through a rapid augmentation in the number of circulating white corpuscles, or phagocytes, and by means of an increase in the dissolved principles the purpose of which is to act upon and injure the parasites and to neutralize their toxic or poisonous products. This process is either identical with or closely related to that which takes place during recovery from infection, which consists in the bringing into being of a new set of operations that gradually reinforce the natural resistance—a process termed immunization. The indications of the immune condition are found by the appearing in the blood, sometimes between the fourth or fifth and the tenth day of the disease, and somewhat later than they have already appeared in the spleen and bone-marrow, of highly potent substances that are directed in a specific manner to the direct neutralization

of the poisons which have been and are still being produced by the parasites, and to the destruction of the parasites themselves through heightened phagocytosis. As recovery progresses, the soluble immunity principles continue to increase, until, at the termination of the disease, they are present in the blood in quantities that suffice, often, by a passive transfer to another individual, to protect him more certainly from infection or to terminate abruptly an infection already established. If in imagination we substitute for man a large animal, such as a horse, and if we conceive the immunization process to be carried forward by design and in a manner to cause the minimum of damage and to produce the maximum of immunity response, we have presented to our mind's eye the principles as well as the method upon which the serum treatment of disease is based.

I should like to emphasize, at this point, the fact that the foundation of the modern specific treatment of infectious diseases by serums, by inoculation of dead bacteria, and even by specific chemical compounds, rests upon the working-out—in laboratories, upon animals and man—of the manner in which spontaneous recovery from disease takes place. It has been through imitation of nature's way of curing disease that the efforts of modern control have been forwarded.

One result of scientific work of this form has been demonstrated in the benefits obtained from injections of dead bacteria in certain forms of pyorrhea alveolaris where the internal line of defense is abnormally weak. There are, however, many factors which influence the possibility of curing infections which still remain to be solved by scientific investigation. Nevertheless it is most essential that we possess a clear understanding of the present scientific view on the subject of immunity before considering the special field of infections originating in the mouth.

ORAL INFECTIONS.

The forms of bacteria in the mouth which have been of especial interest to the dentist have been the pus-producing or "pyogenic" bacteria. At the same time there are many reasons to suppose that numerous other organisms may be highly cultivated in different portions of the mouth, and under favorable conditions become the direct cause of pathogenic disturbances in any of the important tissues of the body.

In studying the subject of oral infections it may be well to divide them into two classes: First, conditions in which the infection is found in the mouth; and second, where the infection is sealed in what is known as a blind abscess in the alveolar process in the intra-apical region. Frequently infections of the latter class will come under the first class when, by reason of some increased irritation and inflammation or of operative interference, the heretofore confined pus finds an outlet into the mouth. The mouth is at all times the habitat of numerous pyogenic bacteria, which are ever ready to produce infection and pus formation if immunization becomes impaired.

PURULENT AND NON-PURULENT EXUDATES.

What is pus, and how is it distinguished from inflammatory non-purulent exudations? Pus may be said to be a term applied to a collection of leucocytes or white corpuscles, chiefly dead, occurring in an inflamed area of the body. There is always associated with the white corpuscles constituting the pus a certain amount of serum, also derived from the blood. When the serum greatly preponderates we speak of the exudate as serous, in contradistinction to purulent, but all real inflammatory exudates contain pus cells, which are revealed by the microscope. Hence purulent and non-purulent

exudations are distinguished by macroscopic differences and by microscopic differences of degree rather than of kind. Thus a purulent and a non-purulent inflammatory exudate can be caused by the same micro-organisms. A given bacterium will produce at one time a purulent and at another a so-called non-purulent or serous exudation. The presence of purulent matter in the mouth may be due to various causes. The most common is perhaps the ordinary alveolar abscess, where an infected dead pulp becomes a focus for a continuous flow of pus through the alveolar plate into the mouth. Following this in frequency are the various pathologic conditions around the peridental tissues, which are most commonly grouped under the term pyorrhea alveolaris. In such cases there is always a lack of immunity against the first line of defense, and as a result infection starts at the most vulnerable point under the gingivæ and progresses toward the ends of the roots of the teeth. This results in the formation of pockets alongside the denuded cementum of the root, which increase in capacity according to the gravity of the case.

Another cause is some form of trauma, which plays an important rôle in the formation of pockets of this nature alongside of individual teeth. The destruction of the first line of defense in such cases is mostly produced by improper dental operations. The great number of cases where only one or two teeth are affected in this way gives us absolute assurance that purulent exudations of this nature are not contagious. Another source of free pus in the mouth is found in impeded eruption of third molars. Purulent exudations in the mouth may also come from impaired tonsils or from the pharyngeal region. Exfoliating pieces of necrotic bone or roots are also frequent etiologic agents.

EFFECTS OF INGESTED PUS.

The effect upon the rest of the body of the constant swallowing of purulent matter has been the subject of much argument. Many physicians have accustomed themselves to the habit of calmly dismissing this subject and assuring their patients that all bacteria and pus are destroyed in the stomach by the gastric secretions. Miller's experiments published over twenty-two years ago have been corroborated in every scientific laboratory which has taken up the study. He showed clearly that mouth bacteria are carried into the stomach and thence into the intestines. Granting that certain forms of bacteria are destroyed in normal quantities of gastric secretions, the fact remains that the stomach is devoid of acid peptic secretions during a large part of the time. Digestive action is stimulated by the taking of food. The mere swallowing of saliva and water does not suffice to cause a true digestion. At the commencement of a meal there is scarcely any acid in the stomach, and only two or three hours later is the maximum amount of acid found. Science has today practically eliminated the idea that the gastric juice is a barrier to the passage of bacteria and pus from the stomach into the intestines. Recognizing the fact that everyone is constantly swallowing bacteria, the question arises as to the outcome. Another phase of immunity must answer this query. Undoubtedly most of the swallowed bacteria are destroyed, not by the digestive secretions of the stomach and intestines, but by competition with the normal intestinal bacterial flora which has, so to speak, pre-empted

the ground, where the nutriment is, after all, limited in quantity.

When, however, instead of merely swallowing the ordinary bacteria mixed with the food, the individual is constantly swallowing certain amounts of pus, an entirely different problem presents itself. The nature, virility, and number of the micro-organisms must have a strong influence as to their ability to overcome the surface immunity of the digestive tract. All forms of diseases of the stomach and intestines are possible. By means of their development in the digestive tract such bacteria are very easily absorbed in the circulation and pass into the lymph spaces. After this fortress of the body has succumbed, the bacteria with their poisonous results appear to be irresistibly drawn to the most vulnerable of the vital organs. Medical literature is replete with citations of almost every form of disease due to pyogenic bacteria which are traced to this one source. Hunter gives the following very lucid classification of possible results:

(1) Local affections, such as stomatitis, periosteitis, sinus infections, inflammation and infection of the tonsils and the pharynx. Besides these diseases we meet with many cases of diseases of the middle ear and different portions of the eye, and a host of diseases of the skin often very remote from the mouth. Amongst these may be mentioned acne, alopecia areata, eczema, erythema, herpes, edema, seborrhea, erysipelas, and others.

(2) Glandular affections, especially about the neck.

(3) Gastric and intestinal affections, such as septic gastritis, septic enteritis, colitis and proctitis, appendicitis, cholecystitis, and septic inflammation complicating typhoid ulceration.

(4) Hematogenous infections, causing pleurisies, empyemata, nephritis, pyelitis, and perinephric abscesses, cholecystitis (and among surgical affections, most notably, osteomyelitis) and ulcerative endocarditis, various toxic effects on the blood, nervous system, and kidneys, connected with sepsis.

The poisons act sometimes more on one particular tissue—for example blood (causing septicemia, pyemia, anemia); or the nervous system (producing severe mental and degenerative effects). Sometimes the toxins may act more on the organs of excretion—for example the kidney (producing nephritis); sometimes on the skin (producing rashes); sometimes on joints (producing so-called rheumatic swelling).

All these different diseases have been noted by Hunter as a result of his hospital investigation into their etiology. It is not our intention to point out in detail every disease capable of owing its origin to pus in the mouth. The character of cases cited is sufficient to indicate that every pyogenic bacterial infection can possibly have its origin in this manner. Hunter's interesting statement of the localization of these toxins in some organ in one case, and again in some other organ in another case, is borne out by many celebrated clinicians. If we ask the question why certain bacteria or their toxic products localize in particular organs, the answer must consist in a statement of observed facts, since an answer in principle is not possible with our present knowledge.

CARDIAC DISEASE DUE TO ORAL INFECTION.

Most local infections, and abscesses especially, are caused by the pus-producing bacteria. These bacteria are known to localize by preference in the heart, the kidneys, and the voluntary muscles. The endocardium of the heart and the endocardium of the valves especially are subject to the localization of the pyogenic bacteria. It is believed that the susceptibility of the heart valves is determined

in part by mechanical conditions, namely, the force with which the blood is thrown against the heart valves in the course of the cardiac systole. Under these conditions the bacteria suspended in the blood may be forced into the cells covering the surface of the valves. Once localized there, they are more readily capable of multiplication. The pyogenic bacteria suspended in the blood tend also to be deposited in the glomerular capillaries of the kidneys, where they may multiply; but on the whole, the number of cases in which abscesses are produced in the kidneys in human beings as a result of a general pyogenic infection is not very large. The number is much larger in the experimental staphylococcus infection of the rabbit. Bacteria circulating in the blood are deposited by preference in the bone-marrow, spleen, and liver, in which organs they may, and often do, degenerate, but in which sometimes they multiply and produce local lesions.

Several factors enter into the separation, by the different organs, of the bacteria present in the circulating blood. They include (*a*) size of capillaries, (*b*) rapidity of the circulation, and probably (*c*) capacity for elimination.

PUS IN THE MOUTH DUE TO IMPAIRED NUTRITION.

It must not necessarily be taken for granted, where there is a diseased condition of the heart, kidney, or other vital organ, and at the same time a free flow of pus in the mouth, presenting symptoms known as pyorrhea alveolaris, that the mouth condition is necessarily the etiologic factor. In such cases the pyorrhea is more often the result of the malnutrition rather than the cause of the same. Just as the toxins from mouth bacteria attack some special organ, we find that the malnutrition resulting from an inflammatory disease of some important organ impoverishes the circulation and consequently impairs nutrition. This impoverishment varies in character and form—not yet scientifically determined—according to which organ may be affected and the extent of the pathologic tissue. This impairment of nutritive cells is found at its maximum in the ultimate capillaries. The gum and peridental sockets afford by far the best example of the most ultimate of capillaries.

VARIED CLINICAL PICTURE IN PYORRHEA ALVEOLARIS.

It is not unreasonable to suppose that the chemical change that takes place in the blood under such circumstances varies according to the organ involved and the nature of the malady. This accounts for the great difference in the clinical picture of the gums in different forms of pyorrhea alveolaris. Irritation from uncleanliness soon destroys the first defense, and the clinical appearance of the localized infected area varies from the soft, spongy, bleeding gums in diabetes, to the firm, pale, and indurated gum in chronic nephritis. It varies from the dark purplish gum in valvular affections of the heart, to the livid, light, pale gum in pernicious anemia.

These differences in the clinical picture, when once understood, point with unerring certainty to the original cause of the disease. Many years ago I was impressed with the value of mouth inspection in applicants applying for life insurance, especially when some incipient form of malnutrition exists. Referring the matter to one of the largest companies, I was met by a positive refusal

even of investigation, because the officers did not desire to increase the difficulty of taking out an insurance policy.

BLIND ABSCESSES, AND THEIR EFFECTS.

Considering now the second division of our subject, we are confronted with an entirely different clinical picture. The fact that teeth may have abscesses at the ends of their roots without the exudation therefrom reaching the mouth has long ago been noted. But it is only since the use of the X ray has become known in bringing to our view the detailed picture of the alveolar process that we have been aware of the large number of blind abscesses which exist. Even today the radiograph is used so sparingly for diagnostic purposes that it is difficult to estimate the number of people who are suffering from the constant absorption of pus sealed in the bony recesses at the end of a root, of which there is no external evidence. Gilmer of Chicago estimates this number at twenty-five per cent. of the population.

Most of these abscesses are a result of the putrefaction and infection of a dead pulp in a tooth. There is, however, a proportion of abscesses which develop around the end of the root without any infection from the pulp, as these are known to be vital in many cases. These are known as pericemental abscesses. There is also a certain proportion of such abscesses found at the ends of teeth in which there have never been any fillings, and which have never even had any external defects of structure; but, on being opened, the pulps are found to be dead. In such a case it is not unlikely that the death of the pulp is due to the pericemental abscess.

Inflammation with subsequent infection in the periapical space is at once accompanied by an effort of nature to limit the area of the pathogenic exudate, and as a result we find a thick fibrous envelope, a granulomatous defense, surrounding the same and thereby protecting the adjacent parts as much as possible.

The variation in the anatomical picture of the blind abscess is very great, both as to size, shape, thickness of protecting envelope, and character of the exudate. When the power of the toxins rises to a certain pitch, the envelope ceases to be able to protect the adjacent tissue. The inflammation becomes more extensive, the exudate forces its way between the sheaths of the tissue and generally terminates in an opening into the mouth by way of the alveolar plates. The spongy character of these plates makes their infiltration with pus a comparatively easy matter. Blind abscesses have been known to remain quiescent for many years, and then, on account of some change which has not as yet been scientifically demonstrated, exhibit such an increased activity as to produce an open alveolar abscess.

Macroscopical investigation has demonstrated the fact that there must be a great variation in the constitution of the exudate, in the number of cells, color, and odor. The scientific investigation of these variations should prove to be an interesting subject. Another field for investigation is the determination of what may be the difference in bacterial nature between the exudate of a pericemental abscess and one resulting from putrefactive pulp tissue. There is very little doubt that in most cases of blind abscess a gradual absorption of the bacteria is going on continuously. The pathogenic bacteria escape from the local foci of in-

fection by penetrating into the surrounding pervious lymph spaces and capillary vessels, into which they push through continuous growth, or are carried by their own motility or by motile phagocytes. If time permitted it would be interesting to detail the histories of some of the numerous cases of blind abscess which have been followed by lymphatic infections, skin affections, septic endocarditis, arthritis, nephritis, etc. That such pathological conditions ensue is borne out by the clinical observation of most reliable authorities.

BACTERIOLOGY OF BLIND ABSCESSES.

Given a large carious cavity with a dead pulp, it is most probable that any of the well-known pyogenic bacteria could find a most favorable lodging-place in such a pulp, where propagation would be a very simple matter. Undoubtedly it is necessary to make a bacteriologic investigation of the exudate in such abscesses, and also of the focus from which they spring, before we can make any scientific assertions as to the diseases which may ensue from such a pus product. This will be no easy task for the investigating dental bacteriologist. Some valuable work has already been done. In discussing this subject at the last meeting of the American Medical Association, Dr. C. J. Grieves of Baltimore stated that, together with Dr. W. S. Baer of Johns Hopkins University, he had made a study of over a hundred-odd cases in which apical infection in blind abscesses was the primary portal of entry resulting in septic arthritis. In some of these cases of blind abscess they were able to isolate absolutely the infecting micro-organisms; this was found in all cases to be the staphylococcus. He says further:

> In almost every instance there had been some bad *apical* dentistry done—some portion of necrotic tissue left or some effort made to fill the root-canal. . . . . These cases were of long standing, with abnormal temperature that ran for months. Some simulated tuberculosis, but most of them were arthritics. . . . In many fistula cases associated with arthritis (not blind abscesses), when the fistula healed, the temperature of the patient would go up, showing pressure absorption from retention of pus, and when the fistula was opened and drained, the temperature would become normal again.

It must be remembered that these two researchers were only investigating arthritic conditions. A few isolated cases will not suffice; they must be so numerous and of so great a variety of disease as to satisfy the scientific world. Clinical evidence, however, leaves us today in a position to believe that such investigation will show that there are very few infectious diseases which may not start in this manner. If anything approximating such a condition is found to be correct, it makes the blind abscess much more dangerous to the individual than free pus in the mouth. In these cases there is absolutely no escape from the penetrating bacteria. The symptomatic rise in temperature that so often accompanies them probably depends in a degree on the amount of bacteria that are able within a given time to escape in the circulation.

SEPTIC DENTAL OPERATIONS.

Unfortunately as a profession we must admit that most of the cases of blind abscess are the results of imperfect dental operations. In some cases these may be the result of bad judgment on the part of the operator, in others they may be due to ignorance and incompetence, but

a very large number of cases are attributable to the failure of an educated dentist to give the time needed to perform an aseptic operation and leave the field absolutely free from the possibility of future infection. This is undoubtedly nothing short of malpractice when done by a dentist who knows. In a number of these cases the fee which the dentist could obtain, if he gave the necessary time, would be so small that it would not give him a living wage. In most instances the fear of losing the patient, if they charged a moderate fee for the time needed, causes many dentists to perform what may justly be termed septic dental operations. Very likely few of them realize the grave danger to the life of the patient that may result from such methods. The time has arrived when we should understand that the art of our labor is only a means toward preserving the health of the most important part of the body. Without deriding the great value of the mechanical part of our profession, and realizing that its usefulness is in proportion to the skill and manipulative ability of the dentist, we must recognize the fact that no dental work is permissible if any danger of infection lurks in its midst. The solution of this problem is the education of the physician and also of our patients to a realization of the danger of leaving septic foci in any part of the mouth.

CONCLUSIONS.

Summarizing, we can safely assert that the health of the individual is always menaced by infection, if pus is allowed to be produced in the mouth or locked between the walls of the alveolar structure. All local causes of infection should be removed as far as feasible.

Neither the mummifying method nor the retention of small amounts of pulp tissue in a root-canal should be tolerated. Adequate methods of pulp removal have been evolved which are feasible in the vast majority of cases. This means removing from the root-canals, in an aseptic manner, every particle of organic tissue, and sealing both ends of such an aseptic canal with a non-infectible filling material.

If a tooth is to be preserved under such conditions, the time required to perform properly such an operation should never be curtailed.

If for any reason it becomes impracticable to carry out a pulp operation on these lines, the patient's interest is best served by the extraction of the tooth.

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Discussion.

Dr. M. I. Schamberg, New York, N. Y. I deem it an honor to be called upon to open the discussion of a paper which I consider the best and most important one that has been presented to this association in years. I say this without looking lightly upon the papers that have preceded it. Dr. Rhein we all know to be a painstaking, conscientious worker and an enthusiastic teacher. He has done work in the past which has reflected credit upon him and upon his profession, but his present contribution in the form of this complete and explicit dissertation on the systemic diseases originating from infective foci in the mouth, together with the physiologic and pathologic *modus operandi* related thereto, eclipses anything, in fact everything that he has done before to teach an important human economic truth.

As an evidence of my concurrence with him in his views upon the subject I will quote several paragraphs from an article upon "The Reciprocal Influences of Morbid Conditions of the Mouth, Jaws, and General Economy," which I read before the Section on Stomatology of the American Medical Association, at its sixty-third annual session, June 1912.

After a brief reference to the work that had been done throughout the civilized world in promoting the necessary interest in the care of the mouth as a prophylactic measure against disease, this article reads as follows:

There is, however, much to be done to establish in medical, dental, and lay minds a knowledge of the tremendous bearing that certain mouth and jaw diseases have on the general health, and, furthermore, the manner in which many disorders can be early detected by a careful examination of the mouth. I will not dwell on the fact that many persons are rendered more susceptible to disease by the lowered vital resistance created by tooth, mouth, and jaw troubles. This is too evident to all who give the matter any thought, but I want to lay stress on the frequency with which patients under treatment for mouth troubles are permanently cured of deviations from the normal which originally appeared to have no relation to the local lesion within the oral cavity. It is equally true that many systemic disorders are either directly or indirectly responsible for morbid conditions of the mouth and jaws.

Further on the article reads:

How very unusual is it, however, for physicians to make careful observations as to the conditions of the mouth as a whole, to determine the presence of lesions on the mucous surface of the cheek, the floor of the mouth beneath the tongue, the palate, the gingival margins of the gum, or the roof and floor of the vestibule of the mouth. These parts to the stomatologist impart even greater information at times than do the tongue or lips. Just as does the dark line in lead poisoning exhibit itself, so do other changes in peripheral circulation leave their mark. Faulty metabolism, auto-intoxication, rheumatism, gout, anemia, diabetes, renal, cardiac, and pulmonary diseases, all show their ill effects on the gingival border of the mucous membrane, and often before symptoms are sufficiently pronounced in other parts to cause the patient to consult a physician.

It is no unusual occurrence in my practice—and no doubt my experience conforms to that of many who specialize in the treatment of diseases of the mouth—for me to refer to the family physician patients who on examination of the mouth are found to be in the incipient stage of one of the many maladies aforementioned. Indeed, I have occasionally found a patient to be in the throes of a well-advanced illness of no trivial character. In several instances, the true cause of what appeared to be an ulcerative or gangrenous stomatitis was recognized as the dreaded oral manifestation of leukemia only after I had insisted on a blood examination.

Then again:

The reciprocal influence of abnormal conditions of the mouth and jaws on the general economy has not been accorded up to date the importance that it must receive, if the health and welfare of human kind is to be consistently conserved.

Stress should be placed on the eradication of infective foci from the mouth, even though radical surgical procedures and the sacrifice of teeth become necessary. Current literature, both medical and dental, contains many references to the relation of remote diseases to infections arising within the mouth. Infective endocarditis, rheumatism, anemias, and other affections of serious moment are occasionally laid to the door of mouth infection. Many patients in my practice within recent years have exhibited decided attacks of neuritis involving the arm, shoulder, and other parts, that have cleared completely following the surgical removal of an infected area from the mouth. Patients who are suffering from diabetes, kidney troubles, etc., which may have been the predisposing cause of gingival disturbances within the mouth, are usually improved when efficient treatment removes the pus, which by absorption aggravates the systemic trouble.

Before closing I desire to make reference to a paper by Baker* in which he presents a compilation of diseases attributable to mouth conditions. According to his list, 125 different affections were traced by scientific men to dental and mouth disorders. In studying the bibliography of Dr. Baker's article, I find that almost all authors quoted are graduates of medicine. I refer to this point as the strongest evidence toward the verification of their findings, and that such reports were not made as the result of biased observations. Though Dr. Baker collected seventy-nine articles, written within the past ten or eleven years, from which he culled the references to the large variety of diseases, such sporadic outbursts of individual enthusiasm are scarcely adequate appeals for the betterment of the cause for which we are working. The dental profession, the medical profession, and the lay public have begun to realize what scientific stomatology will contribute toward health preservation.

Dr. Edward C. Kirk, Philadelphia, Pa. Mr. President and members of the association,—I want to add my word of approval to all that has been said by the gentleman who preceded me in commendation of the paper to which we have just listened. I do not want to be fulsome in my praise of it, but I want to be just, and believe that I am just when I tell you that I regard it as one of the most important emanations that has come officially from the dental profession upon this important topic. I am particularly gratified that the committee in charge of this meeting felt the importance of having such a pronouncement made. As a practitioner of dentistry, as a teacher, and as one interested in the welfare and progress of dentistry, I confess that I have been chagrined and annoyed, as I am sure that everyone of you must have been, when the charge of neglect and ignorance of the conditions with which we are dealing was laid at our doors, not only through professional channels but through the secular magazines and the daily press, by Dr. Hunter of Charing Cross Hospital, London, in a paper on oral sepsis, read at McGill University in October 1911—for the unpleasant phase of that criticism was that much of it was true. I am speaking now within the confidential limits of the professional family, therefore I do not hesitate to say that the fact that much of it was true furnished the reason for the sensations of discomfort that I am sure it produced in all of our minds. Fortunately there

* Edward H. Baker, "The Natural Field of Dentistry." *Dental Cosmos*, June 1912, page 694.

was much to be said upon the other side of the question that unfortunately was not said. We have needed some official declaration of the fact that we do recognize these things, and are not all so ignorant and careless as the perusal of Dr. Hunter's paper might lead the uninitiated to conclude that we are. Therefore I am personally grateful to Dr. Rhein and to this association, and I congratulate myself and you that this authoritative presentment of the other side of the case has been made.

Now, it would be utterly useless for me to attempt to discuss the various items of the paper. It is a voluminous one, and the time at our disposal is not adequate for its proper discussion. As a fact, the nature of any discussion that I could present to you would be to agree in general with the various things the essayist has said—because he has given a remarkably clear and careful presentation of what might be called the existing status of our knowledge of the conditions and the principles underlying disease reaction. I use the word reaction in a thoughtful, considerate sense, for I have come to regard the phenomena in the entire field of pathology as manifestations of a reaction upon the part of the organism toward either external or internal irritative sources. One thought that may serve to throw a little side light on the principles involved in the subject under discussion is that expressed by Sir William Osler in his work on the Practice of Medicine, somewhat after this fashion—I cannot quote it accurately, but this is the substance: He said, "It may sound paradoxical, but is none the less true, that few patients die from the disease from which they have been suffering for most of their lives." There has generally been, precedent to the terminal acute and fatal attack, a long period of ill health, so slight perhaps as to pass unnoticed, but which has had as its characteristic effect a gradual depression of that set of conditions which the essayist has referred to collectively as the defensive agencies of the body; these have been running down in efficiency until a point is reached at the level of susceptibility, the point where some wandering microbe, which under conditions of normal health would not be of a sufficiently virulent type to attack that organism, finds only this condition of lowered resistance—the organism has become vulnerable to invasion by the group of bacteria in question, and the patient is carried off by a terminal infection made possible only by his preceding chronic ill health. Now, it is to the conditions precedent to these terminal infections that we should direct our attention as dentists, for there are several oral conditions that are related to the precedent disease which leads to the depression of vitality to the point where terminal invasion may occur and work out its fatal results.

The essayist has spoken of the constant swallowing of quantities of bacteria as a depressing influence. In order to focus our attention upon that condition in a manner that will allow a proper understanding, let me use a simile: We are familiar with the fact that the cinchona tree, for example, produces certain medicinal substances; the poppy plant likewise produces medicinal substances; we speak of a variety of cinchona alkaloids and of alkaloids of opium. We realize that these substances are products of the life activities of the protoplasm of the cells of the plants in question, that they represent the chemical end-products of the biologic activity of the cells of cer-

tain vegetable organisms. We know also that in certain diseases where these alkaloidal substances are used as medicines they are useful in bringing about the reaction of the organism that tends toward health, but we also know that if we administer an excessive dose it will kill the patient; we know that this vegetable end-product of metabolic activity is intensely active, and we know also that the unicellular vegetable organisms, so-called pathogenic micro-organisms, in like manner produce end-products of their nutritional activity that are intensely active as poisons; hence in any case where these microbic end-products are taken into the system it becomes a question of the reaction of the human organism to these virulent poisons. It is not ordinarily the organism itself, but its waste product that does the harm. We know what happens from repeated doses of cocain or any of the so-called drugs that enslave; we know that there follows a gradual destruction of the vital resistance to the stresses of life, and how those who become so addicted finally succumb. So that the principle underlying the reactions of the organism to the drug habit applies also, in a degree, to what we may call the toxin habit resulting from the ingestion of the poisonous bacterial waste products.

The study of disease becomes, then, a study of the reaction of the organism to these influences. Whether the organism is attacked locally or *en masse* is determined by the factor of general or localized susceptibility. As the individual who has a lowered resistance is picked out of a crowd with an attack of an acute disorder, and he dies, so also, owing to a localized susceptibility, a circumscribed part of the organism may become the seat of a local expression of disease action.

When I was engaged in the active practice of dentistry a man came under my charge, sent by a physician to have his mouth placed in proper hygienic order previous to undergoing a course of mercury for syphilis. Every tooth the man had was sound, relatively speaking, with the exception of the upper right first molar, and that was pulpless. I had been told by the patient that the tooth in question had been filled twelve years before by a competent practitioner; I therefore assumed, though I did not fill it myself, that it was filled after the ideal standards that have been promulgated by the essayist on many occasions—that is to say, that it was a sterile operation; that, however, was before the days of the X ray. The thing that interested me particularly was the fact that immediately following his syphilitic inoculation —and the affection was then in the early period of the secondary stage—a dento-alveolar abscess developed at the apex of the palatal root of that dead molar, which abscess broke upon the palatal gum surface, and the exudate that passed from that abscess flowed down toward the gingival margin. An erosion of the gum tissue ensued which looked as though the gum tissue had been seared or excoriated by a red-hot instrument about three millimeters in width. Now, it was interesting that the general syphilitic lesion should have ferreted out, as it were, the point of least resistance furnished by that pulpless molar and made its attack selectively at that point. I became so interested in the nature of the root-filling that one day I undid the whole operation to ascertain its perfectness, and so far as I could tell it was perfect. There had been no trouble from that tooth until this systemic infection occurred, and then that point of diminished resistance mani-

fested its weakness. So it was again a question of the contention of two forces, internal and external; the weaker point, as the essayist has described to you, demonstrated its weakness by disease.

There is one point that I missed in the paper, and which I presume in reading it more carefully I shall discover, and that is, the essayist does not appear to have laid sufficient emphasis upon the various conditions which make for susceptibility and immunity. I refer to his statement regarding those highly complex substances that enter into the composition of the blood-stream that are developed under certain conditions, natural or artificial, and which raise the standard of resistance of the individual to infection, and upon which the practice of vaccine therapy is based. But there is, besides that group of complex defensive bodies, opsonins, agglutinins, etc., a factor which I think should be recognized —that is, the chemical composition of the blood, a factor which I think cannot fail to influence the question of susceptibility or immunity. We all know—all who have come in contact with bacteria in a scientific way—how sensitive they are to the simple question of the acidity or alkalinity of the medium upon which we attempt to cultivate them; we know that certain bacteria will thrive on a pabulum that has a certain reaction, and that a change in reaction may retard or inhibit their growth. Now, Talbot, Rhein, and others have called attention very definitely to conditions of pyorrhea that arise in connection with the malnutritional fault resulting in what is called acidosis or acidemia, which results in a lowered alkalinity of the blood. I think all of us as practitioners must have been struck with the frequency of the observations that we have made of mouths where no carious defect has been manifest, and yet that denture has been lost by a fatal attack of pyorrheal infection. The conditions in which these two classes of disorders, caries and pyorrhea, occur are totally different, and fundamentally the difference is a question of food supply to the bacterium, and this in turn is a question which is determined in the individual case by the nature of the blood composition.

With such data before us, one cannot escape the conclusion that the mouth and its contained organs and tissues are in the closest relationship both nervously and nutritionally with the entire organism, and that it is therefore undoubtedly true, as set forth by the essayist, that the closest relationship also exists between infected mouth conditions and various forms of bodily disease; but I wish to emphasize very strongly my conviction that the converse of this proposition is equally true, namely, that the mouth tissues and their various manifestations in health and disease, by reason of the close physiological relationship which exists between them and the general bodily functions, become in their several physiological and pathological manifestations a most important index of the state of bodily health. The observed fact to which I have alluded, of the non-existence of active caries and of active pyorrhea simultaneously in the same mouth is more than simple coincidence. I have already suggested the hypothesis that the chemical composition of the bodily juices upon which the infecting organisms of each of these respective disorders grow is a selective factor in determining the infection in each case. If that view be correct, then it must logically follow that a principal factor of the cause of susceptibility in either or both

cases must be sought for in the chemical composition of the tissue juices and saliva which constitute the food supply of the infecting organisms involved in each case; and, as the composition of the blood plasma and the various bodily juices derived therefrom is dependent upon the food habit of the individual and the nutritional activities concerned with the utilization of the food supply, we can at once appreciate the magnitude and importance of a correct understanding of the story of nutrition both in its local and general expressions, and further, that the mouth, its contained organs and tissues, and the physiological and pathological phenomena which they present, offer fundamental problems for our consideration and, as far as may be, our intelligent solution.

M. H. Cryer, Philadelphia, Pa. The subject of Dr. Rhein's paper I consider of vital importance, not only to the dentist and physician, but to everyone. It is second in importance only to that of anatomy and physiology. Some time ago I wrote a chapter on Hygiene of the Mouth for the "Practical Treatment," edited by Drs. Musser and Kelly, from which I should like to make a quotation:

> The mouth is the workshop wherein are carried on the functions of mastication and insalivation and the preparation of the food for its reception by the other digestive apparatus; and if we add a consideration of its intimate anatomic, physiologic, and therefore pathologic relations through its nervous connections with other portions of the alimentary canal, with the organs of respiration, sight, and smell, and only less intimately with those of hearing, the mouth at once acquires an interest, and its care assumes an importance second to those of no other part of the body.

It is certain that the frequency of the mouth's agency in the production of diseases is often overlooked, though fortunately its importance in diagnosing obscure cases of intestinal infection is becoming more recognized, since Wm. Hunter of London gave us his valuable observations on "Oral Sepsis." It has, however, often been noted that an examination of all the fluids and tissues of a patient may be exhaustive in extent, while a septic mouth is entirely overlooked by the diagnostician.

As Dr. Rhein has told us, when the mouth is studied from a bacteriologic standpoint the necessity of hygienic treatment becomes most apparent, and remedial aims only be accomplished when the teeth can be kept in a healthy condition. Whenever irregularities or disease conditions exist which provide lurking-spaces for bacteria, oral sepsis is bound to be present. The infant's mouth and that of edentulous old age are usually clean, barring constitutional diseases, and, while I do not recommend this condition as a type, it is important that the dentist should realize that he must finish all work so carefully that there are no pockets for germs to occupy, and if a tooth cannot be brought into a clean, healthy, and comfortable condition, it should by all means be removed.

Concerning the cleaning of root-canals, I would say that, in a large number of cases, it is not possible to say whether all "organic matter" has been removed or whether the canal has been completely filled, unless a skiagraph examination be made.

I should like to add one point more in regard to the care that should be exercised in cases of protracted illness, especially that of typhoid fever. Too often a nurse will neglect the thorough cleansing of the mouth; consequently, by the time convalescence begins, and the pa-

tient is permitted to resume mastication, the teeth have accumulated unwholesome and often purulent deposits of foreign matter which, becoming loosened and mixed with the food, are taken into the alimentary canal; here they may infect the previously weakened intestinal tract, causing serious relapse and often death.

Dr. TRUMAN W. BROPHY, Chicago, Ill. As Dr. Rhein began to read his paper I observed that quite a number of the members who were evidently not particularly interested left the hall, but before he finished I became impressed with the fact that the number of men and women whom this hall would hold would be a small audience for this remarkable production, and it is fortunate that a scientific paper such as this may be conveyed to all who are interested throughout the world. Some of the most remarkable orations ever delivered in this capital city and in Congress were delivered only to a quorum of the members, and, even though this hall was not filled, I am satisfied that this classic production will be of interest to people of all the languages of the earth.

What does this paper mean to us? Without entering into a discussion of its scientific phases, I wish to state that it means that the usefulness of the work of the dental profession will be taken notice of by scientific bodies everywhere, and that it will be more highly regarded than before. It means that the medical profession, which in the years past has regarded lightly the sphere of usefulness of the practice of our profession, will now look upon it as of far more importance than ever before. The conclusions reached by the essayist in pointing out the maladies which have origin in the mouth will be a matter of great interest to all, especially to medical men, and they will look into regions which have in the past been overlooked, for the origin of the diseases which they have to treat.

It was my great pleasure only about two weeks ago, in the city of Stockholm, Sweden, to listen to an address delivered by that distinguished gentleman, Dr. Horace Fletcher, to the Commission of Hygiene of the International Dental Federation. Dr. Fletcher—I speak of him as doctor, because, if we ever had a doctor according to the true meaning of the word, viz, teacher, Horace Fletcher is that doctor, for he has taught the medical profession how to recognize and treat diseases and cure their patients without the extensive use of drugs. He has taught the dental profession better than it was ever taught before the true sphere of its work, he has taught the dentist a higher regard for his work than he ever had before. So with his paper, Dr. Rhein has brought to us and the world generally a fuller understanding of the sphere of our work.

Dr. T. B. HARTZELL, Minneapolis, Minn. I have no desire to review Dr. Rhein's paper, but I do want to make two or three statements regarding it. Dentistry is standing on the threshold of one of its greatest epochs; it will soon be recognized as one of the important foundation-stones upon which the whole healing art rests. Physicians all over the world are looking more and more to intelligent dentists for assistance in diagnosis and for help in intractable cases. It now rests with us whether or not we will dignify our profession and put ourselves in that position which medicine and the world at large have a right to expect of us. This remarkable paper of Dr. Rhein's, with the author's perfect comprehension of the conditions which

face us and with those profound statements regarding the importance of our work, is a contribution which will redound to dentistry and affect posterity as no other production I have listened to in a dental audience in my whole life. I believe that it is but a brief time when any general surgeon who is to operate on the abdomen, or interfere in any way with the system in abdominal surgery, will as soon think of operating when the hemoglobin is less than thirty per cent. as think of operating on a patient who has a septic mouth.

Dr. A. M. Nodine, New York, N. Y. I was very glad to hear Dr. Rhein so lucidly and comprehensively review such great facts, and the thought came to me that Dr. Hunter, to whom the essayist has referred and with whose work we are all more or less familiar, should be justly honored by us. Anyone who reads the articles which Dr. Hunter has read before the British Medical Association will gain a more accurate comprehension of what oral sepsis means. When we consider that Dr. Hunter conducted innumerable examinations, in one series I think two thousand, of microscopical and macroscopical character, in order to ascertain his findings, we shall appreciate what we owe to Dr. Hunter. More recently several other investigators, notable among them being Dr. Curtis of Johns Hopkins University, have given us contemporary information in regard to oral sepsis.

Dr. Rhein (closing the discussion). It has been very embarrassing to sit and listen to the eulogistic remarks from men like Professors Kirk, Cryer, Brophy, and others, when I feel that in a sense they are not entirely deserved. Whatever value my work will have is due entirely to my effort to do a certain specific duty at the request of this section; the work was not voluntary on my part. Although, with the chairman of your section, Dr. Logan, I felt that the need of the hour was an article on this subject which should be educational to the physician, I did not feel capable of carrying out the work as effectively as it should have been. I realized that it must present the matter without exaggeration and with such clearness that it would withstand any scientific criticism. It was consequently with great trepidation that I undertook the work. While I realize its shortcoming, I trust it will be of service in educating the patient's physician as to the danger of pus foci in the mouth. If it in any way accomplishes the result, I will feel amply rewarded for the time and energy expended.

The lack of dental education in the medical curriculum is the cause of the unpardonable ignorance of so many physicians as to both physiologic and pathologic conditions of the mouth. No one submits his mouth to this form of septic dentistry more than the average doctor. If he only would stop and think, he would realize that septic foci in this region must produce the same effects in the circulation and the lymph spaces that they would produce in any other part of the body. Can we imagine a physician on the score of economy placing his mouth in such a state as to invite destruction of the muscles of the heart? The majority of physicians are treating themselves in this way daily. How can we expect them to give their patients' welfare any better consideration?

The removal of the pulp from a molar and leaving this tooth finally in such an aseptic condition that infection is impossible requires much more difficult technique than the removal of a septic appen-

dix. Yet there is little difference in the danger to life between a septic appendix and a blind abscess. Death comes rapidly as a result of a septic appendix, but none the less surely does it follow a blind abscess because it may take a few years for the incurable organic disease to manifest itself. The unfortunate thing has been that the physician has hitherto failed to realize that this incurable organic disease is the result of a slow toxemia produced as a result of pus in the mouth.

It is my hope that the National Dental Association will be able to use my paper to teach this important truth to the medical world. Every effort has been made to keep it free from exaggeration, which is the bane of most dental propaganda. This tendency to further the interest of a good cause by exaggeration is inherent in all of us, but out of place in a scientific body. The great value of oral hygiene is beyond question. Yet at this time many of the medical profession are distrustful of its real value, because of the exaggerated and framed-up statements that are sent broadcast through the country. We dentists have not yet learned the lesson of resting the merits of our case on a dispassionate statement of proved facts, free from fraud or exaggeration but stamped with the one mark of attempting to seek the truth in whichever direction it may lie.

In reference to the difference in the chemical changes that take place in the blood serum that makes for immunization, I disposed of it in one sentence, because it is too large a subject to be able to consider in its essential features in a paper of this general character. The time does not permit me to illustrate many of my themes with some lantern slides I have brought with me, but I shall be pleased to show these slides at the clinic on Friday.

Dr. Hartzell made a statement which I think should be emphasized. The majority of conditions known as pyorrhea that come to the office of the dentist for treatment are not such as require heightened phagocytosis or a raising of the opsonic index. Such cases are mostly found in the hospitals. They do exist, however. I have been waiting for many months now for a suitable case for vaccine injection.

Dr. Cryer brought up an interesting point in speaking of typhoid fever cases. Very many typhoid epidemics are due to what are known scientifically as typhoid-carriers. A person recovering from an attack of typhoid is seldom subject to a secondary attack himself, but may convey the germs of the disease to another person. Such an individual is known as a typhoid-carrier. If such an individual has a dirty mouth and carious teeth, here may easily be found a good soil for cultivation and spreading the disease. It may therefore be well to emphasize the necessity of the dentist who has recovered from a typhoid attack being certain that he is not a typhoid-carrier before he resumes his practice.

In closing, let me call your attention to the main point. The great amount of septic dentistry done is because of the inability of the dentist to get a living wage if he takes the time requisite for aseptic dentistry. By educating the physician as to the relation of septic dentistry to life itself, the time must come when the conscientious dentist who is willing to give the time and skill to aseptic dentistry would at least receive a proper compensation for it.

Preparations for the Toilet of the Mouth and Teeth.

By L. F. KEBLER, M.S., M.D., U. S. Department of Agriculture.

I CONSIDER it a great honor and privilege to address the members of this association on a subject of such vital importance to the general health of the American people. The invitation to take part in the proceedings of your convention stated that "Dentifrices" would be the subject for discussion. I believed the term "dentifrices" too circumscribed to cover the subject in mind adequately, and for that reason have chosen the above title for the topic on which I am about to speak.

Nevertheless, the term dentifrices appears so elastic at present that it may be applied to any agent used for cleansing the teeth or mouth, or for preventing and treating disease of the teeth and gums.

PREVALENCE OF DENTAL CARIES.

The members of this association are continuously inspecting mouths. All of us have teeth the greater part of our natural days, and all present believe that the care of the mouth and the preservation of the teeth are of vital importance for the maintenance of good health. It appears to be a well-recognized fact that the stability of the teeth is undermined in proportion to the advancement of civilization. One of the causes for this deterioration is undoubtedly the diminished use of the teeth on account of the many prepared foods available, which require little mastication. It is a law of nature that an organ develops and is valuable in proportion to its use; atrophy and disease usually attack useless and unfit members of the body.

ORAL PROPHYLAXIS IN HISTORY.

The need felt of caring for the teeth dates from remotest antiquity, when the care of the mouth and teeth was in the hands of the medical profession. There were then no such specialties as dentistry and stomatology. The Ebers papyrus contains prescriptions for what might be called dentifrices, of which the following is an example: Powdered flint stones, green lead, and honey. Caries of the teeth and some of the agents causing this disease were referred to by such men as Aristotle.

Prophylactic treatment was considered by Celsus, Pliny, and other early writers. During the fifteenth century, Giovanni of Arcoli formulated a dental decalog, the tenth commandment of which reads as follows: "The dentifrices to be used last thing at night or early in the morning." The nature of the dentifrices then

in vogue does not appear to have been divulged, but it was well recognized that the use of very hard substances which abrade the teeth was to be avoided. From time to time there were conflicting ideas as to the use of highly acid agents for cleaning the teeth; for example, in the seventeenth century, Dr. Rivière advises cleaning dirty teeth with undiluted acids. The results of the use of these cleaning agents do not appear to be recorded.

Dr. Pierre Fauchard, in his book entitled "Le Chirurgien Dentiste," published in 1728, advises against the use of acids, and says in substance: "It is true these acids remove the débris from the teeth, but a little investigation will show that undesirable action upon the teeth has taken place." Fauchard refers to toothbrushes only to condemn their use. Dr. Bell of the eighteenth century advocates the desirability of using coarse, gritty dentifrices, even though their use resulted in the denudation of the enamel of the teeth. It appears that he believed that the enamel would regenerate just like the nails and hair. One of the foremost observers of the early nineteenth century, Dr. Joseph Fox, in his book entitled "The Natural History of the Human Teeth," vol. ii, page 32, 1806, refers to the secret of preventing dental caries as follows: "This delightful secret, although it is pretended to in the advertisement of every quack, we can only expect to acquire when the philosopher's stone and the grand panacea have been fulfilled." The question naturally suggests itself, How much progress has been made since the above utterance?

ANTISEPTICS IN THE COMBATING OF DENTAL CARIES.

The views in vogue in the United States during the middle of the last century were that acids, no matter whether introduced into the mouth or produced within the mouth, are injurious and tend to the formation of caries. It was also believed that it was necessary to keep the teeth absolutely clean by artificial means, and prescriptions for chalk dentifrices were given. This embodies the idea of antacids as a means of preventing dental diseases. Carious teeth, however, were as numerous as ever; in brief, the conditions were about the same as in the days of Fox. The above represented the situation before the great discoveries of Pasteur, the observations made by Miller, and the epoch-making discoveries of antiseptics and aseptic surgery. The question naturally arises: Has any material progress been made as the result of these discoveries, and, if so, what is it? After learning of the beneficial inhibiting effects of the antiseptics on the activities of bacteria, it was naturally believed that here was the means by which the bacterial flora of the buccal cavity could be controlled or stayed, if not absolutely destroyed. Experiments, however, soon showed that it was impossible to sterilize the oral cavity, or even to appreciably diminish the number of bacteria without using the drugs in such strengths as to make them intolerable, if not absolutely dangerous, either because of their disagreeable odor and taste, or because of their effects upon the mucous membrane and their toxicity. The idea was similar to the fallacy developed relative to destroying tuberculous germs in the lungs by the introduction of germicidal agents. It is a very simple matter to inhibit the growth of, or destroy the bacteria in a test tube with certain agents, but to introduce these potent toxic agents into the human lungs and bring them sufficiently into contact with the organisms so as to

destroy the bacteria is quite another matter. It is now a well-recognized fact that no germicidal agent can be introduced into the lungs of sufficient strength to have any material influence whatever upon the germs causing the disease. While the same is undoubtedly true of certain bacteria of the mouth, yet there is no doubt that the chances for their destruction in this location are more favorable. It is a well-recognized principle in bacteriology that the greater the dilution of a germicide, the longer the time of action necessary to destroy the bacteria, and *vice versa*. From the necessary dilution already considered, it is quite evident that none of these germicidal agents can avail much in sterilizing the mouth, and that antiseptics are of correspondingly little actual value.

DIFFICULTIES OF NEUTRALIZING THE ACIDS IN THE MOUTH.

Almost every dentifrice, paste, or mouth-wash is advertised and heralded to the public and trade on the basis of its supposed antiseptic value. With the advancement of bacteriological observations, the idea still prevails that caries is largely due to the action of acids upon the teeth, but the idea of bacteria developing as a result of the activity of the acids has been proved incorrect, in that it has been clearly demonstrated that the action of the bacteria upon the food particles which insinuate themselves between the teeth is the cause of the acids. If this is correct—and there is at present no reason to believe the contrary—it would appear to be a very simple matter to provide for the difficulty, either by keeping the mouth absolutely clean so as to prevent bacterial action, or by introducing some agent into the mouth which would neutralize the acids as formed. In practice it is virtually impossible to carry out the former, and the latter has certainly not been put on a satisfactory basis.

ACIDS IN POPULAR MOUTH-WASHES.

An examination of the mouth-washes commonly used shows that a goodly number contain free acid; in some instances the amount is fairly liberal, in view of the fact that acids are considered as a contributory if not the actual cause of dental caries. In this connection I desire to call particular attention to one of the most commonly used mouth-washes available, namely, hydrogen dioxid. This article is probably more freely used by the public at large than any other, or all tooth-washes combined, and for this reason should be of such composition as to represent the maximum of efficiency and the minimum of harm. Its manufacture is free to all. On referring to Bulletin No. 150 of the bureau of Chemistry, entitled "Technical Drug Studies," pages 12 to 14, it will be found that the amount of free acid present in the available brands of hydrogen dioxid—of which there are about forty—varies from 1.5 cc. of N/10 calculated as sulfuric acid for each 25 cc. of the product, to 10.7 cc. acid for the same amount. From the present status of our knowledge, I believe that hydrogen dioxid of proper quality is the best artificial mouth-wash available.

ALKALINE DENTIFRICES.

Under normal conditions saliva is considered the best mouth-wash. It acts during the entire 24 hours of the day and 365 days a year; artificial agents at best act only during a few minutes per diem. The cunning of man has not as yet suc-

ceeded in preparing the equal of saliva for use as a mouth-wash. It is alkaline in reaction, and therefore tends to neutralize certain amounts of the acids that may be produced as the result of bacterial action. A majority of the dentifrices, pastes, and mouth-washes are alkaline in reaction, the idea being that these antacid products will neutralize the free acid of the mouth. It is self-evident, however, that the amount of these alkaline substances that may be introduced into the mouth is very small, and can act only over a very limited period of time, particularly when compared with saliva. One of the specific objections raised to these alkaline products is that alkalis tend to diminish the flow of saliva, and cause stagnation in the mouth.

Powders containing the dioxids have been placed on the market during recent years. Theoretically, great results might be expected, as in other dentifrices. It would seem, however, that the dilution, as in all others, is too great to give them any material advantage. The chemical most commonly employed as a base for dentifrices is calcium carbonate. Experience seems to show that this substance is best suited for this purpose for the following two reasons: It neutralizes the free acids, and is not sufficiently hard to abrade the enamel from the teeth. Some observers contend, however, that powders are dentrimental as cleansing agents for the mouth, for the reason that they provide nuclei for bacteria and ultimately develop into the undesirable plaques.

DANGER OF COLORING AGENTS IN DENTIFRICES.

During the past few years some observations have been made relative to the deleterious influences of coloring agents commonly employed in dentifrices. One of the foremost workers in this line is Dr. W. H. O. McGehee of Cincinnati. Dr. McGehee expected to be present at this convention until a few days ago, when he wrote stating that it will be impossible for him to come to Washington on account of school work, but he forwarded me a number of specimens on which he had made observations. From these observations it appears that the use of coloring agents in dentifrices is fraught with danger. From what has been said above, it is clearly evident that the ideal tooth-wash is still to be found, and the question asked above—namely, Has there any material progress been made in dentifrices, tooth-pastes, and tooth-washes during the last half-century?—must in general be answered in the negative. Some will very probably differ with this conclusion; if so, the speaker would be pleased to be advised in what particular, with facts, the conclusion is erroneous.

STERILE WATER ADVOCATED AS MOUTH-WASH.

In surgical operations it has been found that sterile water is about as useful as many of the antiseptics and germicides employed. Taking all things into consideration, it would appear that sterile water for rinsing the mouth, accompanied by the use of some instrument which will remove the food particles, is the best means of keeping the mouth clean and diminishing the progress of dental caries.

TESTIMONIALS FROM DENTISTS CRITICIZED.

The members of the dental profession, it would appear, ought to be fully con-

versant with the above facts, yet on looking over the advertisements used in conjunction with the various dentifrices, pastes, and tooth-washes, it is found, with rare exception, that they are accompanied by indorsements and testimonials from medical men and dentists. It appears, also, that these testimonials are given at times on the most flimsy basis, of which the following is typical:

October 20, 1908.

Dear Sirs,—Your sample of tooth-paste was received in due time, and have found it the best tooth-paste of its kind I have ever used. Thanking you very kindly for the sample, I wish to remain,

Yours respectfully,

....., D.D.S.

It is clearly evident that the above testimonial was based upon a sample which permitted observations only over a very limited period of time, and of necessity could have been used only in conjunction with a few patients. The circular from which this testimonial was taken contains twenty-six others. Other indorsements and recommendations are represented by the following:

"It has been thoroughly tested by some of the most eminent dentists in this country, who have without exception strongly indorsed it and proved it." "Indorsed by many of the medical and dental professions." "Used and recommended by the dentists of America as best for the teeth." "I most cheerfully bear testimony to the unrivaled excellence of ..... for the teeth."

A DENTAL BOARD OF INVESTIGATION OF THE MERITS OF DENTIFRICES ADVOCATED.

The above represents information to serve as a guide in the examination of dental preparations. The members of the dental profession know, or should know, these facts. It is to the members of your profession that we look for support in our efforts to eradicate false, deceptive, and fraudulent products from the market. It therefore behooves the dental profession to take such steps as may be necessary to discontinue the indorsements of products which, as they ought to know or could know by a little investigation, are not as represented to the public. If the members of the dental profession are not willing by such action to protect the public health, it is a most difficult problem for those charged with the enforcement of the laws to eradicate false and deceptive remedies. There is no difficulty whatever on our part in attacking palpable frauds, but when the advertisements are arranged in such manner as to deceive by the indorsement of the members of the dental profession, the problem becomes a most difficult one. In view of the conditions obtaining, I take the liberty of recommending that there be appointed in this association a committee to take this matter under consideration, and to report at a subsequent meeting.

Report of the Committee on Scientific Research.

By HENRY C. FERRIS, D.D.S., New York, N. Y.

I WISH to state that the work of this committee has been greatly hampered by unavoidable circumstances, due first to misunderstandings between the editor of the *Dental Cosmos* and your chairman in reference to the publication of the charts of last year's report, published in the November 1911 issue of that magazine, and the delay of the publication of the association's Transactions.

LAST YEAR'S REPORT.

It is not a simple matter to introduce a new technique in physiological or biological work, and while the members of my committee, representing nine universities of the country, are willing and anxious to carry out the undertaking, it must be remembered that it is a side issue to their daily procedure, without remuneration, and that they have been unable to carry through the problems presented to them to a point where definite conclusions can be drawn at this time; and while this statement is disappointing on first consideration, we may congratulate ourselves that we have been able to interest the universities in this effort.

In our report of 1911, we started a research, employing a given technique, to improve our information upon the normal physiological action of saliva upon foods, and noted the effects of stimulation through the function of mastication, with and without the sense of taste, upon some of the physiological properties of this secretion. We also attempted to determine the effects of certain chemicals used in mouth-washes upon these physiological properties.

This work was but a beginning, which was to serve as an illustration of the vast amount of information needed before we can come to any definite diagnostic conclusions that will assist us in the treatment of the maladies to which our special domain of the human body is subject. The greatest value can be attained through the careful tabulation of findings of a number of scientific workers operating under a uniform method of procedure, and it is toward this end that your chairman has been working for the last five years. When we compare our last year's report with the thousands of examinations made of the urinary excreta before any definite conclusions were drawn, we may be encouraged.

SCOPE OF THE WORK.

The object of this undertaking is to improve our information, so that we may

more intelligently study the etiology of the pathological processes of the oral cavity. There is no short road to procure the information we seek, viz, the Causes of Caries in the tooth structure, and of Pyorrhea Alveolaris, the two most prevalent diseases of mankind; and in consequence of the difficulties presented, we beg your indulgence.

In this year's effort, each investigator was requested to examine with our technique ten specimens of as nearly normal mouths as could be found, showing normal urinary analysis within physiological limits, where the acidity had been titrated.

The problems presented to the different universities were as follows, and were to constitute a budget report over the signature of each experimenter:

H. Carlton Smith, representing Harvard University, Dental Department: To develop a technique for the quantitative analysis of carbon dioxid (CO_2).

Russell W. Bunting, representing Michigan University, Dental Department: Bacteriological research as directed toward the subject of caries.

Frederick B. Noyes, representing Northwestern University Dental School: Acid index and the viscosity.

W. H. G. Logan, representing Chicago College of Dental Surgery: Acidity and enzymic index.

E. Hoffmeister, representing Baltimore College of Dental Surgery: Relation of enzymic index and urea.

A. W. Lee, representing California University, Dental Department: Physiological research.

J. B. Stein, representing New York College of Dentistry: Blood pressure and viscosity.

Friedrich Hecker, representing Kansas City Dental College: Method to determine bacteriological index of oral cavity.

H. M. Semans, representing Starling-Ohio Medical College, Dental Department: Relation in caries between potassium and sodium base.

Report on Quantitative Analysis of Carbon Dioxid.

H. Carlton Smith:

Dear Doctor,—In making my report to you in reference to a method of determining a quantitative value of CO_2 in saliva, would state that I have done quite a little work on a method of determining the acidity due to CO_2, and inclose cut of apparatus which I have used.

I have found by means of this apparatus that the carbonic acid content of the saliva differs with the method of collection, and that the acid reaction to phenol-phthalein is in the majority of cases temporary, and due wholly to CO_2. Many salivas, however, show a permanent acidity after removing all CO_2, and it is the relation of such samples to disease conditions of the teeth that interest me particularly.

The air is drawn from left to right, first through a potash bulb to absorb atmospheric CO_2, next through 10 cc. of saliva diluted with 20 cc. of water contained in a small Soxhlet flask, whereby the CO_2 from the saliva is carried through the "test-tube condenser" and collected in baryta water in the Erlenmeyer flask at the left. This in turn is connected with a suction pump or aspirator. The "drip cup" has been found necessary when working with very viscid samples. The "thistle tube" holds water for maintaining the volume in the Soxhlet flask, if the condenser is not used.

The amount of free CO_2 may be determined by adding a standard carbonate solution (N/100 Na_2CO_3) to a volume of baryta water equal to that used in the Erlenmeyer flask, and then comparing the degree of turbidity obtained. This may be done by viewing through flat-bottom tubes (shell tubes) of about 20 cc. capacity, or, in many cases, better, by use of the Duboscq colorimeter used for determination of ammonia.

I am working with a viscosimeter, but have not attained results which would be of value to you as yet.

I trust that this work will continue, as I believe it to be of great scientific value.

This method presented by Prof. H. Carlton Smith directs us into an entirely new line of thought, and is bound to modify our technique and control our conclusions as to acid content.

We are now analyzing for free and combined acids, there being a marked difference in these readings, but by this method we learn that an immediate examination of a specimen for acidity should be taken, or our present method, as far as free acids are concerned, will be valueless. And it will furnish a method of quantitative value of carbon dioxid, and cause us to investigate the physico-chemical reasons for its production. We shall await with interest Dr. Smith's report on this subject.

Report on Method to Determine Bacteriological Index of Oral Cavity.

Dr. Friedrich Hecker:

Dear Doctor,—Answering the inquiry of the letter received recently, I will say that after a period of ten years of study of the bacterial flora of the mouth, I find that at this time I am able to isolate and grow eighteen different varieties of micro-organisms. Of this number, the majority have been found in the mouths of patients suffering with pyorrhea.

I have, however, grown a great many organisms in normal mouths. Many of these organisms morphologically, microscopically, and also culturally, correspond to the same types found in the mouths of patients suffering with pyorrhea. Hence I believe it is fair to say that the bacterial flora of the mouth, especially in normal mouths, differs little from that in diseased mouths, the only difference being that those mouths in which the disease is found have a lowered immunity, and as a result of this lowered immunity, the organisms find an excellent field for growth.

This being the case, one can readily understand why a certain type of organism is found in greatest predominence in diseased processes of the mouth.

I believe it is safe to say that I can isolate and grow in the normal mouth at least from ten to fifteen organisms, any one of which is capable of producing disease processes. A detailed description consisting of morphology, cultural characteristics, and a staining reaction would require a great deal of hard work for a considerable period of time. However, if you desire such information, I will try to furnish you from my notes such data.

Personally, I have been pursuing some work on leucocytes. I find that in cases of pyorrhea the condition is characterized by the following blood-picture:

	Per cent.
Neutrophilic polymorphonuclears ...	46
Large lymphocytes	40 to 60
Small lymphocytes	3 " 5
Eosinophiles, transitionals, degenerates, basket cells, and irritations making up the balance.	
Basis on a percentage of 100 cells counted.	

I can with considerable accuracy now make a diagnosis of pyorrhea on this leucocyte count. Accompanying this process there is always found an intestinal toxemia, and as soon as this condition has been corrected, a marked result is noted in the mouth. The gums, as a rule, do not bleed as readily, the tongue is no longer coated, and the foul breath of toxemia is no more in evidence. This work, while it does not apply directly to dentistry, is of interest because of the physiological process noted.

Hoping that this brief account of work will interest someone to carry it further, and that the brief description of the blood-picture will be of service to some future investigator, I believe this is about all the work that I can at this time report.

Report on Bacteriological Research into Dental Caries.

Dr. Russell W. Bunting:

My dear Doctor,—My report as to the work that I have been doing is as follows: I spent practically all my time in the investigation of the relative rate of fermentation in a large number of mouths. From this work I have a large amount of statistics, which are very interesting indeed, but not definite enough to justify me in drawing any hard-and-fast conclusions as yet. I therefore cannot make a report upon my work, as it is not complete, but I hope to take it up another year and

obtain some definite knowledge of some of the phases of the problem, at least.

The work in the bacteriological field, being ably represented by these gentlemen, is shaping toward definite conclusions.

The report of Dr. F. Hecker, with his technique, will contain many points of advanced information from which we can draw conclusions, as it bears upon the biological action of the physiological properties of the secretion, and causes us to investigate those conditions which interfere with a normal quantity of the ferment oxydase, which to a large degree controls the immunity of the organ.

It is to be hoped that they will be able to produce for us a simple method of determining the bacteriological index by a method similar to those used in determining the index in the feces.

DIAGNOSIS AND TREATMENT BASED ON SALIVARY ANALYSIS.

Your chairman in his report wishes to submit the history of a case from practice, in which the diagnosis and treatment has been governed by information gained by salivary analysis, thereby proving its practical value.

Case. Dr. D. S. Gardner of Scranton, Pa., who was suffering from hyperchlorhydria, presented himself for treatment, introduced by Dr. C. C. Laubach of the same city. The history of his case was as follows: He had a malocclusion of his teeth, and presented fifty-three inclined planes in occlusion, which reduced the masticating ability of his organ sixty-one per cent., as compared with the one hundred and thirty-four inclined planes in normal occlusion.

The continual regurgitation of acid into his throat and mouth became so acute that he had to give up his practice of dentistry and put himself in the hands of a pathologist, who put him upon a starvation diet until he had lost thirty pounds. This treatment in no way relieved his condition. His only relief was to chew gum, thereby increasing the flow of saliva.

He changed his medical adviser, and was put upon five meals a day, eating as much as he could at each meal. The medication recommended was unimportant. In a period of a few weeks, he gained thirty-five pounds, but still his acid condition existed. Your essayist made an examination of his saliva and urine. Since a high percentage of free acids and an excessive amount of chlorin, with a urine normal excepting for a small increase in the percentage of indican was found, sodium chlorid in all forms was eliminated from his diet. As a result of this examination he was then recommended to masticate each mouthful of food fifty times, and drink five glasses of water daily between meals.

Examinations of his specimens were then made every two weeks, and the increase in the elimination of acids in the urine, the gradual decrease of the acids and chlorin in the saliva and the variation in sulfo-ammonia, were notable. At the end of three months he became normal, and his trouble disappeared.* The

**Summary of examinations.*

Date.	Sulfocyanate.	Aminoacids.	Chlorin.	Salivary acid index.	Urinary acid index.
May	1:14,000 or 0.00684	1: 7,000 or 0.0142	0.124	9.5	30
June	1:11,000 " 0.00909	1:11,000 " 0.00909	0.081	4.5	40
July	1:16,800 " 0.00595	1: 7,200 " 0.0138	0.094	8.5	44
August	1:11,000 " 0.00909	1: 7,000 " 0.0142	0.060	3.5	50
Sept. 7th	1: 9,000 " 0.01111	1: 5,800 " 0.01706	0.048	2.0	45
Sept. 20th	1:14,000 " 0.00684	1:12,000 " 0.00833	0.024	1.5	40

correction of his malocclusion and prosthetic restoration were recommended to restore his masticatory organ to its normal ability. If this were not done, the prediction was made that he would suffer from some other intestinal lesion.

The recommendation not being heeded, an attack of appendicitis occurred six months later, and an operation was performed. There may be an exception taken to this conclusion, but I relate this late experience as a matter of history. After this experience he had prosthetic restorations made, and has been in good health for the last two years, having resumed his practice.

The technique utilized was one of the first recommended, and gave but little information for study, but was sufficient to cure this case. Exception cannot be taken to the scientific reasoning from a physiological standpoint, and the experiment can be duplicated upon almost any subject, as your essayist has proved.

Further experimental work is now being undertaken upon several cases, and promises to give more startling results than I am at this time able to report.

Your chairman believes this to be the first pathological case reported where salivary analysis was the basis of the diagnosis; where from hyperacidity the oral secretion was returned to its normal condition, with beneficial constitutional effects, without the use of medication. This we trust will stimulate your interest in a wider scope in the practice of dentistry, hoping that records of this character will soon be duplicated in a large number, so that our services as specialists in the healing art may be more thoroughly appreciated by the scientific world. While we do not want to enter the field of medicine, we should aspire to care for the pathological conditions of the oral cavity.

What I have tried to impart will no doubt be welcomed by the most practical minds, who will find in these physiological facts some explanation, even though it may be meager, of the pathological phenomena, and, who, by knowing the true state of affairs, will be led to more carefully restore each anatomical part of the tooth, and will appreciate that the thirty-two teeth collectively must be considered of more importance to the functioning ability of the human organism than has been generally appreciated.

I am convinced that it is by frequent interchange of opinion between the physiologist and the dentist that the common goal of physiological science and of dental art will be more quickly reached.

Respectfully submitted,

HENRY C. FERRIS, *Chairman.*

SECTION I:

Prosthetic Dentistry, Crown and Bridge Work, Orthodontia, Metallurgy, Chemistry, and Allied Subjects.

Chairman—Weston A. Price, Cleveland, Ohio.
Vice-chairman—Harry E. Kelsey, Baltimore, Md.
Secretary—Marcus L. Ward, Ann Arbor, Mich.

TUESDAY—First Session.

The first meeting of Section I was called to order on Tuesday afternoon, September 10th, at 2.30 o'clock, by the chairman, Dr. Weston A. Price, Cleveland, Ohio. The secretary, Dr. Ward, not being present, Dr. E. T. Loeffler, Ann Arbor, acted as secretary.

The first item on the program, as announced by the Chairman, was the reading of a paper by Dr. William O. Hulick, Cincinnati, Ohio, entitled "Crown and Bridge Work."

Dr. Hulick's paper here follows:

Crown and Bridge Work.

By WILLIAM O. HULICK, D.D.S., Cincinnati, Ohio.

Three years ago, in Cincinnati, Dr. Green, an Episcopal minister, delivered a very interesting and highly instructive lecture entitled "The Gospel of Discontent." He made the statement that progress in all avenues is made by reason of the desire for something better; that we would retrograde were it not so. It was this discontent that gave us Edison's numerous inventions. Dr. Burbank, not satisfied with his wonderful success in plant life, succeeded in making food and drink out of the cactus, seemingly one of the most useless of plants, for the stock

of the plains. He produced a pitless plum, and has worked hundreds of other miracles.

DISCONTENT THE STIMULUS TO PROGRESS.

The whole complex machine of commerce and industry—factory, farm, railroad, bank, office, government—has been built for production, construction, distribution, and protection. The present machine is the product of slow evolution, and the effort of the centuries to build a machine which will better cope with the problem has been the primary cause of our advance in the various activities of life. Integrity, honesty, sound health, fair dealing, respect for others' rights—these have come from the courageous assumption of one's burden of work, and the opposites of these are the results of the desire to dodge the burden.

The spirit of unrest, whether it be evidenced by the spontaneous and seemingly unaccountable strike of automatic workers, the questioning introspection of university faculties, the open defiance of law, or the cry for the doctor of industry, is the headache giving warning of deeper-seated organic trouble.

The worth of our education, our laws, our scientific management, will be determined by the extent to which they will make clear, conform with, and supplement the laws of work. Their test will lie in the degree to which they are useful in leading us safely forward to better, brighter conditions of work, and their basic idea must be service to the mass.

But what has this to do with dentistry, you will ask? The answer is, that many years ago our profession had and still has this discontent, and by reason of it has made most wonderful progress and success. We have had conscientious workers in our profession who have laid the foundations upon which we are building our houses today. Not being contented with the methods which were good in their time, we have improved them by working constantly, earnestly, and untiringly, thus performing a more perfect service for these bodies of ours.

THE MASTICATING APPARATUS.

Dr. Green referred to the wonderful machinery, the achievement of man, and how it is watched, cared for, and run by the most competent engineers our institutions of learning can produce, and how they will not overwork these machines beyond their capacity or requirement. He made comment on what has been done in the perfection of stock-breeding, making the astonishing but true statement that in the human body God has given us the most perfect and complete piece of mechanism yet known, and at the same time the most neglected. One of the most important parts of this mechanism is the teeth, and in the beginning the Creator intended them to do good service during the natural lifetime of the machine, biting off, grinding, and thoroughly preparing the fuel for this wonderful piece of machinery. They are arranged so that in the act of mastication they rotate and glide over each other without forcing their antagonists or themselves out of alignment. The service required of them in an ordinary meal is from 800 to 1200 closures or triturations of the mandible, while an extra large meal will require from 1500 to 3000 such movements. The crushing force in the act of mastication differs with occupation and environment; also certain foods require greater force than others. It is safe, however, to estimate

this crushing force to be from fifty to one hundred and fifty pounds, and, under training, the muscles of mastication are capable of exerting a stress of nearly three hundred pounds on the first molars. We must conclude from these facts that it is necessary to have a complete arrangement to perform the natural function of mastication properly throughout the natural lifetime of the body as intended by the Creator. This brings us to another conclusion; that, with the loss of one or more of these natural organs, the general arrangement of the remaining teeth is changed, they become malposed and out of alignment. Occlusion, mastication, and assimilation become faulty, and many times the general health is impaired to a greater or lesser degree. It has been demonstrated beyond peradventure that the molars are necessary, and, when lost, must be replaced by artificial means. This gospel of discontent has played an important part in dentistry, and today we are not content with the methods of yesterday, yesterday we were not content with methods of one year before, and so on back for one hundred years.

PROGRESS IN DENTISTRY.

Were it not for this discontent, we would not be here assembled to exchange ideas for the betterment of the mechanical servitude, the esthetic effect, and the pathological disturbances caused by crown and bridge work. This discontent has worked wonders in all the branches of our profession, prosthetic, orthodontic, and operative. It gave us the Condit method of removable partial dentures, which has rendered good service, later the Roach and Gilmore, the Peeso, and many other methods of removable bridge work, the Mason detachable porcelain facings, and later the Steele, Goslee, and other facings. The most wonderful method of the age, the Taggart cast inlay, which has revolutionized operative and prosthetic dentistry, and Dr. Callahan's sulfuric acid treatment, which is being used successfully the world over, are also products of this spirit of unrest. It has taught us intensified prophylaxis and oral hygiene, which have brought more relief and comfort to humanity than perhaps any other treatment practiced by our profession at the present time.

SHORTCOMINGS IN CROWN AND BRIDGE WORK.

In view, however, of the scientific attainments and the untiring efforts of teachers, writers, and clinicians the world over, I believe in all sincerity that crown and bridge work is the most abused of any branch of our profession. Many operators, either owing to ignorance, lack of skill, or a purely commercial viewpoint, disregard the fundamental principles and mechanical laws, pathological conditions and practical uses, and the obligations imposed upon them. I believe more teeth are lost by faulty construction, misapplication of force, lack of knowledge, or a total disregard of the pathological, physiological, and mechanical principles and requirements than by any other cause. Oral sepsis is caused by pockets which collect food and invite decay; inflammation of the underlying tissues is caused by faulty construction, and teeth are loosened and prematurely lost by misapplication of force.

ORAL SEPSIS DUE TO FAULTY DENTAL OPERATIONS.

Dr. Wm. Hunter of London, England, has given us some shameful facts, when he says:

No one has probably had more reason than I have had to admire the sheer ingenuity and mechanical skill constantly displayed by the dental surgeon. And no one has more reason to appreciate the ghastly tragedies of oral sepsis which misplaced ingenuity so often carries in its train. Gold fillings, gold caps, gold bridges, gold crowns, fixed dentures, built in, on, and around diseased teeth, form a veritable mausoleum of gold over a mass of sepsis to which there is no parallel in the whole realm of medicine or surgery. I speak from experience. The worst cases of anemia, gastritis, colitis of all kinds and degrees, of obscure fever of unknown origin, of purpura, of nervous disturbances of all kinds . . . owe their origin to, or are gravely complicated by, the oral sepsis produced by these gold traps of sepsis. Time and again I have traced the first onset of the whole trouble of which they complain to a period of within a month or two of their insertion. The sepsis hereby produced is particularly severe and hurtful in its effects. For it is dammed up in the bone and in the periosteum, and cannot be got rid of by any antiseptic measures which the patient or the doctor can carry out. Moreover, it is painless, and its septic effects therefore go on steadily accumulating in intensity without drawing attention to their seat of origin.

The medical ill-effects of this septic surgery are to be seen every day in those who are the victims of this gilded dentistry—in their dirt-gray, sallow, pale, waxlike complexions, and in the chronic dyspepsias, intestinal disorders, ill-health, anemias, and nervous ("neurotic") complaints from which they suffer. The chief feature of this particular oral sepsis is that the whole of it is swallowed or absorbed in the lymphatics and blood. Unlike the sepsis of open wounds on the outside of the body, none of it is got rid of by free discharge on the surface. The effects of it, therefore, fall upon the whole of the alimentary tract from the tonsils downward.

I wish to quote Dr. Ottolengui, who writes as follows in defense of his dental colleagues:

It is not the writer's intention to leave the impression that such evils as Dr. Hunter describes are representative of typical American dentistry. Quite to the contrary, no one better than he knows that perfectly scientific, thoroughly aseptic, and entirely sanitary dental operations are done by thousands of dentists in this country. Yet it is likewise true —and pity 'tis that 'tis true—that thousands of other dentists do exactly that sort of work which Dr. Hunter so aptly terms "septic dentistry."

DEFENSE OF CORRECTLY CONSTRUCTED CROWN AND BRIDGE WORK.

I do not wish to defend or denounce Dr. Hunter, for you know too well that these conditions do exist. On the other hand, I must rise in defense of my profession. I am here to stimulate you, one and all, to a better understanding of the fundamental principles underlying conservative aseptic dentistry. I am here to lead an insurgent movement—if you please, a progressive movement—signifying that we will do a better service today than our best efforts of yesterday were, and that we will help to educate the public in this movement for a higher-class service and a better knowledge of oral hygiene, pathology, and therapeutics, which will help prevent the deleterious conditions mentioned in the above quotation.

It is an obvious fact that these conditions are due to faulty construction and application of crown and bridge work, and are practiced upon the masses by incapable and irresponsible operators, who are criminals, literally speaking; frequently, on the other hand, a good service may have been rendered, and the neglect on the part of the patient be both appalling and criminal. I am positive that carelessness and ignorance and a disregard for cleanliness have caused failures and loss of supports and appliances which under favorable conditions would

have given good service for many years. It is therefore a gross injustice to lay the blame for systemic conditions either on the operator or on the methods of replacement. I wish, also, to call attention to the undeniable fact that where no appliance is worn, unkept mouths with carious, broken-down teeth and abscessed roots which collect food particles and retain saliva to ferment and decay and be washed into the stomach, may and do cause the same systemic degeneration. Patients should therefore, be taught the uses and abuses of all appliances, the possible usefulness of crown and bridge work, the possibilities of a longer and greater service from extreme care and cleanliness, and the difference between good and bad crown and bridge work.

FAULTY CROWN AND BRIDGE WORK DENOUNCED.

In this connection I wish to add a word in defense of the public, in all kindness to my colleagues. The public is most unmercifully imposed upon at times, for it is not unreasonable to state that not over one-half of the patients applying for services can differentiate between good and bad crown and bridge work. Many times they get no service, and wonder why, although they have willingly paid the fee asked. In such cases, good teeth are often mutilated, a clean mouth is changed to an unclean one, and the patient would have been in a far better condition had no appliance been inserted. Therefore, to be progressive we should be capable of rendering such service as we would have rendered to ourselves under the same conditions. If we feel our inability to do this, would it not be better for us to devote our time and energy to the branch of work we are best fitted for? Would it not be better, even in a general practice, to recognize and acknowledge our inability to perform good service? Would it not be more commendable to send our clients to someone who is more capable of performing this special work, than to undertake it and fail? The failure perhaps would not mean so much to us, but would be irreparable to our clients. This course, to my mind, would not be to our discredit; on the contrary, I think our *clientèle* would thank and praise us for our honesty.

We must educate the public to the necessity of oral hygiene, its possibilities and probabilities, especially when an appliance is worn, from a single crown to full dentures. While the above quotations are undeniable facts, and are a sad awakening to some of the conditions that exist, I wish to bring before you the other side of the subject.

FACTORS IN THE CONSTRUCTION OF GOOD CROWN AND BRIDGE WORK.

Of all the products of the labor of the centuries, there are probably none to which we of this generation look with more satisfaction than to the scientific achievement and the mechanical ingenuity evidenced by thousands of our best dentists. Since the advent of the casting method—which simplifies the construction of many appliances and obviates many times the necessity of mutilating sound teeth; of replaceable facings, and many new methods of both fixed and removable bridge work; considering also the advanced education of the public in oral hygiene, therapeutics, pathological, and mechanical requirements, and the use and abuse of appliances, there seems no reasonable excuse for the deplorable conditions we see every day. The funda-

mental principles and requirements governing crown and bridge work are essentially the same as those governing the natural teeth, and should accordingly be heeded physiologically and mechanically. According to natural laws, the teeth were expected to do their own work and no more, for the time allotted to man; therefore, where there is undue pressure, unequal stress, overwork, or pathological disturbance, they will be lost in a surprisingly short time. It is reasonable, then, to admit that, when a tooth is lost and another one is engaged to supply its function, the service of the tooth so engaged is diminished. This being the case, and assuming that the teeth are essential parts of the human economy, it follows that when teeth are lost they must be replaced in the best possible way to give service for the greatest length of time; for at best, that economy is only a repaired one, and should be treated as such. It is my belief that crowns and bridges can be and are constructed in such a way that little or no inflammation is caused around the necks of the teeth or contiguous parts, and that the septic conditions can be reduced to a minimum in both fixed and removable bridge work. It is also my belief that we will become more and more conservative and scientific, and that crown and bridge substitutes will be used until the end of time. For esthetic and physiological reasons, when a single natural crown is lost, the root being in good condition, or when the root is lost, an appliance should be made at once to preserve the natural occlusion and arrangement of mastication. When teeth have been missing for some time, their arrangement will be changed, they will become malposed and out of occlusion, so that complete restoration to normal functions is impossible; also where there are no antagonists, they will become elongated and out of alignment. Since the efficiency of bridge work depends largely upon the superstructure, the teeth to be used as abutments should be well rooted and free from inflammation, the alveolus should be well absorbed in the spaces, and the gum tissue in a good healthy condition. Study models should be made with notations of all difficult cases, to determine the best possible method to adopt. After a careful study of these models, we should be ever mindful of the basic fundamental principles of mechanical and natural laws governing the pathological and physical conditions. As mentioned before, the closures in mastication will be from 800 to 2500 per meal, making an average of at least 3000 per day, or a grand total of more than 1,095,000 triturations at the year's end. Again, fifty pounds would be the fair average pressure required for roast beef, steak, or other meats used by most persons at least twice daily, requiring from forty to sixty triturations for each morsel or bite, before it is thoroughly masticated, a person consuming at least ten bites per meal.

UNREASONABLE DEMANDS MADE OF BRIDGE WORK.

It would seem from the foregoing facts that any bridge would be temporary in its service, especially if the appliance be large. If, however, the conditions are favorable and the mechanical laws have been complied with, the physical conditions will generally change in a degree to accommodate the situation. This being the case, the individual habits change, force of mastication or pounds of pressure become less and less involuntarily,

and nature, providing somewhat for the unusual arrangement, will try to protect the teeth in the extra work imposed. It would be reasonable to conclude from these facts that, if we wish to comply with the physical and mechanical laws of mastication, no large fixed bridge should be inserted. Therefore it would seem unreasonable to expect four roots to support a fourteen-tooth bridge for any great length of time, inasmuch as they are only required to perform and to do their own work for the time allotted to man.

It is also unreasonable to expect the third molar and canine to support the four molars; the second molar and lateral to carry four intervening teeth; the first bicuspid and canine to carry posterior teeth without posterior support; a single molar or bicuspid to carry another molar dummy; a single anterior root to carry another dummy, or two canine roots to carry the four incisors and also the four bicuspids, as in a case that came to my notice. This undue pressure, unequal stress, and overwork will cause the abutment teeth to become loose and sore from periodontal involvement, and the length of time of the service is diminished materially.

INLAY AND OTHER ATTACHMENTS FOR BRIDGES.

Assuming that crowns and bridges or some form of prosthetic appliances are essential to health and appearances, they should be constructed in the most scientific, sanitary, and conservative way possible. All crowns should be counterparts of the natural ones in form and occlusion, contact points, and interdental spaces. All bridge work, whether fixed or removable, should carry out natural laws in articulation and occlusion, so as not to force themselves or their antagonists out of occlusion or alignment. Any large restoration should be of a removable nature, with a saddle on and over the alveolar ridge to receive and resist the impact, the supports serving to hold it in position. When teeth have been lost for some time, and no substitute has been employed, the remaining teeth will become malposed and out of alignment. In this case, in order to get a perfect adaptation at the necks of the supports, the bridge should be made in two parts with a separate post or some other form of attachment. A single molar carrying one dummy should have rest on the adjacent crown. A single anterior root carrying a dummy should have lingual rest on an adjacent tooth, to keep it from tipping over or rotating out of alignment and occlusion. These rests should be on inlays in teeth so employed. The inlay method of attachment for bridge work has many advantages, and has been employed successfully for many years in vital and devitalized teeth. The casting method has simplified this form of anchorage, and obviates the necessity of devitalizing and mutilating good sound teeth by grinding. Truly, in this age of progress, there seems no reasonable necessity for using a gold cap crown, or a porcelain tooth with a band, to cause irritation to the gum tissues surrounding the root, except when the natural crown is lost or so badly decayed and broken down as to require complete restoration.

THE DENTAL OUTLOOK.

This is a grand age for the practice of dentistry. Satisfactory results are obtained in many ways and by many

methods. Result is the all-important point, and as we are our brother's keeper, we should at all times endeavor to use the latest appliances and methods.

Dr. Price made the statement some time ago that, next to his wife and family, whom he loved more than life itself, he loved his profession. Dr. Fletcher once made the statement in public that he would rather minister to the sick and suffering, working earnestly and honestly, and be able to cure, than be president of the United States. I thank God that we have with us at all times such men, in whose hands your children and mine, your friends and mine, are in safekeeping. So let us today make a new resolve to emulate such men, and, like them, be leaders. It was said by our late Dr. J. Taft: "We will pass this way but once, so let us make this good old world better for our having lived in it."

I like to think we are coming to a time when the great march forward to civilization will not largely be a matter of chance, with the blind often leading the blind, but more an organized, orderly movement in conformity with the laws of nature. In that day, the opportunist will not vault into the saddle of leadership when humanity, having been badly led, cries out for a leader; instead he will be a part of history with the medicine man of the savage, for at the bottom both of these, in their creation and in their haphazard panaceas, are the same. On the contrary, humanity will send out a well-trained, well-equipped vanguard of research men—physicists, bacteriologists, chemists, psychologists, biologists, economists, doctors, and dentists—to explore beyond the ranges of the known; it will send its historians back over the line of march to learn the lessons of past successes and failures; it will establish outposts where the facts uncovered will be formulated into laws; and from the outposts to the last mite of humanity will be an established way for the application of the law to the need.

Discussion.

Dr. H. B. Tileston, Louisville, Ky. Dr. Hulick has presented a thoughtful paper and one that may well cause us to pause; for his indictment of methods too frequently employed, even by those who ought to and do know better, is founded upon fact, and is justified.

There are those who, through indifference rather than ignorance or lack of skill, have frequently fallen far short of the application of scientific principles to the construction of crowns and bridges, even as you and I have done.

Dr. Hulick has asked me to direct my discussion to the hygienic and physiologic phases of crown and bridge work. So much has been said and written in the last few years concerning hygiene, and especially oral hygiene, that the public mind is much more fully awake to the importance of a clean mouth in its relation to the general health than it formerly was. Consequently much more is being demanded of the dentist by his patrons in the way of cleanliness, and they are disposed not only to scrutinize critically his person and his surroundings, but to be concerned also as to the hygienic possibilities of certain contrivances put into their mouths to supply lost teeth, and more particularly those fixed appliances known as bridge work.

I make the broad assertion, at the outset, that no piece of fixed bridge work is hygienic. I have never seen a fixed bridge that had been in use for any length

of time that was not more or less unclean, hence unhygienic, depending upon the care given to it by the wearer, as well as upon its construction.

We hear much of so-called "self-cleansing spaces" in bridge work construction, and we know very well that there is no such thing. The larger the spaces provided to facilitate cleansing, the more they invite food impaction, and the more uncomfortable the bridge becomes to the wearer, albeit such spaces may, with diligence, be made fairly clean, but not of themselves.

A large number of bridge teeth supported by a few natural ones as abutments create a condition which is manifestly not physiological, and which grows worse as the number of teeth supported increase as compared with the number of teeth used to sustain them. Even extensive bridges with a minimum of supporting abutments may do well for awhile, but eventually pathological changes ensue, which in time will cause the loss of the supporting teeth.

These two propositions, viz, that bridge work is neither hygienic nor physiologic, are so self-evident that no argument is needed to support them.

The question, then, that interests us as practitioners in this particular art of supplying lost teeth is—Are the benefits to be derived from bridge work sufficient to overbalance the objections to it, and to justify the dentist in subjecting his patients to a certain amount of inconvenience and discomfort?

I think this question may be answered in the affirmative, providing always, of course, that the work is done in such a scientific manner as to reduce to a minimum the objections that are inseparable from it.

Prophylaxis as practiced by the up-to-date dentist of today will solve the hygienic problem. Bridges so constructed that the wearers may keep them nearly clean, may be, periodically at least, made perfectly sanitary by regular visits to the dentist for that purpose. No bridge should be fixed in position without the patient being impressed with the vital importance of caring for it in this way.

The time-honored custom which has prevailed since bridge work was first introduced, of making the dummies—referred to by some as supply teeth—without any lingual surface, leaving a cavernous space to facilitate cleaning operations, fails of its purpose, and is objectionable for several reasons. A better way, it seems to me, is to build the replacement teeth to full anatomical form, lingually as well as buccally, and have the bases rest firmly upon the gum over the ridge, giving a natural feel to the tongue, and permitting of cleansing just as the natural teeth are cleansed. Add to this proper occlusion and articulation, and bridge work becomes a thing of beauty, and a joy for quite a long time.

Removable bridges may not only be kept clean but can be sterilized; yet in spite of so manifest an advantage, many people prefer a fixed appliance, when conditions for such a construction are favorable, to a removable one. Cemented crowns and bridges appeal to most persons as being nearer akin to natural teeth, simply because they cannot be removed, and, after a time, the wearer becomes unconscious of their presence in the mouth. But when teeth are attached to a removable base, they are undeniably "false teeth," an idea extremely repulsive to many sensitive people, and the fact that they *must* be removed frequently for

cleansing is a constant reminder that they are false teeth, and the wearer can never forget them.

Doubtless all have noted the sense of joyous relief that comes to one who has long worn a plate where a bridge was possible, when the bridge was finally cemented to place, and the old plate could be thrown away. And yet if, after the lapse of a year or so, this same individual could see that bridge as intimately as the dentist sees it, he would doubtless be willing to return to his plate with all the ignominy of wearing false teeth, and the necessity or the privilege of removing it and scrubbing it clean.

There is no good reason why single crowns on natural roots should not be so constructed as to be both hygienic and physiologic.

There has been considerable discussion as to the propriety of devitalizing all teeth to be used as abutments for bridge work. I am emphatically of the opinion that devitalization is not always necessary, but I do not think it is merely a matter of opinion, but one of expedience, and not subject to any arbitrary rule. In the case of a molar to be prepared for a gold crown, much depends upon the original shape of the natural crown. If it is bell-shaped or leaning, requiring heroic cutting to prepare it, the comfort of the patient during the operation, as well as subsequently, demands that the pulp be removed. It is seldom necessary to devitalize a tooth for an inlay, either with or without pins.

As a general proposition I would condemn the use of teeth seriously affected by pyorrhea as end-supports for a bridge piece. An intermediate tooth, which has been treated but not restored to firmness, may be held immovable by the bridge and remain comfortable indefinitely, the bridge not depending upon it in any way for support.

Dr. Richard Morris, Evansville, Ill. In accepting Dr. Hulick's invitation to discuss his paper, I was not unmindful of the great responsibility which I assumed; neither was I unconscious of my inability to deal with it in such a way as such a scholarly effort deserves, but recalling with pleasure my association with Dr. Hulick, he being the teacher and I the student, I could not say No to his pressing invitation.

Whenever an operator becomes satisfied that he has perfected himself in any particular work, and that no better service can be rendered, unless he is rescued an untimely end awaits him, and unfortunate are those whom fate turns his way. At all times should we try to make each succeeding operation better than the preceding one, and always strive to improve. This we can do by studying our own weaknesses, and not those of our neighbors. Crown and bridge work today, as exemplified by the best men of the profession, would scarcely be recognized by men who practiced it ten or fifteen years ago. And why this change? The answer is—"The spirit of discontent."

It is not so much the use of crown and bridge work which so often brings about such deplorable conditions in the oral cavity, as the abuse of it. We permit ourselves to be lured on by the commercial side of our profession, and for the time forget the scientific part of it and our sacred duty to our patients; only to awaken, oftentimes, to the realization of mistakes that cannot be corrected.

Crown and bridge work, when practically applied and scientifically constructed, fulfils a most important mission.

I heartily agree with the distinguished essayist when he states that we should

often make plaster casts of the case and study them before concluding what is best to do. Much good to patients can be accomplished in this manner. The orthodontist would not attempt to construct his appliances without first concluding, from a study of his cast, the exact course of procedure. Is not the construction of crown and bridge work, in its relative sphere, just as important?

Fixed bridge work has no place in ill-cared-for mouths.

One of the causes of much unhappiness to patient and operator, in both fixed and removable bridge work, is a faulty preparation of abutments. The success of either depends in no small measure on the proper execution of certain mechanical principles. Any abutment which causes irritation at the gingival margin of the gum is faulty. Some contend that no band can be made which will not irritate the gums. I say that it can be done, but for making such a band time and patience are required, since the lack of either causes failure.

Upon what does bridge work depend primarily for its success? It depends upon the faithful observance of certain prescribed mechanical laws. After the perfect adaptation of the band at the gingival margin, the next most important step is an absolutely perfect occlusion. In a perfect occlusion the force of mastication is properly distributed, the stress on abutments is lessened, and harmony is established between the teeth and the muscles of mastication. How many of us, in years past, have made bridges the sight of which would now cause us profound regret, to say nothing of the patients' regret!

Why do we want the mouth to be hygienic? Why such stringent laws to make it such? On account of the dire results which follow neglect.

Can we expect the stomach to perform not only its own function, but also the functions of the teeth? If mastication be impaired by the loss of teeth or by faulty appliances, the stomach must necessarily do the work of both. And what of the results, when food is carried to the stomach saturated with all the filth and bacteria found in ill-cared-for mouths, and mouths of patients who wear prosthetic appliances? Only one result can follow—an impaired constitution, made ready for the reception of the first invading disease.

Fixed bridge work will always have its place and will always be used for replacing lost teeth, especially in those patients whose means will not enable them to have something better; but just as the sun's rays and the morning dew are conducive to sweetness in the morning atmosphere, just so much will removable bridge work be to the mouths of the patients who can afford to possess it.

Removable bridge work is destined to occupy a lofty place in the profession. It has survived its infancy, and bids fair to grow and become a strong factor in the revolution through which the profession is passing, and I venture to state that the new domain which it will create will add as much to the profession as any other of its specialties.

I have employed Dr. Peeso's method of removable bridge work, and find it most satisfactory. As compared to other systems, its execution is probably a trifle more difficult, but correspondingly more gratifying. I think when the profession understands Dr. Peeso's method and its principles and possibilities, its employment will become more general. Remov-

able bridge work will, in the individual using it, bring out talent which has lain dormant, and by which he can construct an avenue through which his *clientèle* will pass in an increasing array, carrying as their banner satisfaction and contentment.

Our work has passed that stage where it involves nothing more than purely mechanical construction; while the basic principle of the prosthetic side of our profession will always be mechanical, it has become now an art, and he who is esthetic in his aims attains a standard of art, since we cannot expect to reach our zenith until we incorporate the artistic attainment in our work. The antagonism with which removable bridge work has met is one of the stimulating forces causing it to make manifest its many virtues.

Great was the day when the profession changed its internal relationship. There was a time when every operator kept from his brother any information which might be of some help to him, fearing that his neighbor might profit thereby. It is a cause of great gratification that that day has passed. Great is he who rises above and conquers the passion of jealousy, and gives to his neighbor the help and assistance which enables him better to serve his *clientèle* and the public generally.

Along the pathway of progress and the pathway of the "spirit of discontent" we find the derelicts of many promising careers, and from them we may learn a valuable lesson.

Dr. A. P. Burkhart, Auburn, N. Y. I am pleased to have listened to the paper that Dr. Hulick has given us, because it carries with it not only a description of the manipulative skill necessary in such work, but also a high ideal in the construction of crown and bridge work, an ideal which I believe every dentist within the profession should follow along these lines. I would suggest that no man should insert a piece of bridge work in a mouth that he would not be willing to accept in his own mouth. I have been in practice quite a number of years, and during that period I have made my mistakes, like other members of my profession. I have tried, however, to profit by my mistakes and by the misfortunes of others. I believe that the paper referred to, namely, that by Dr. Hunter, was a little too severe, a little too scathing in its criticisms, and yet it carried with it a force which every American dentist should consider. Within the past spring and summer there have come to my notice the bad and ill effects of extreme types of bridges—bridges which should never have been inserted; that have been a detriment to patients, and have not been of any benefit to the operator who constructed them, because of the dissatisfaction they have eventually caused patients. I believe, in the light in which we now stand, that the result of past experience tends more and more, as Dr. Hulick has well said, toward removable bridge work, which carries with it two factors, one of which is along the line of more sanitary conditions of the mouth, and secondly, a more perfect occlusion. It is a fact which cannot be denied that bridges constructed where the stress of mastication is largely exercised upon metal do not give to the patient that result which can be obtained from a well-constructed removable bridge where porcelain teeth are used.

Dr. Hulick speaks of the return of the patient at stated periods for the inspection of the work. This leads me to say that I have no reason whatever, Mr. Chairman, to change my mind along the lines which I advocated in Atlanta in

1906 for the return of patients for the examination and the removal of fixed bridges, which I at that time advocated, in which gutta-percha or cement was the substance used for the setting.

To me it has been a source of pleasure to have my patients return at intervals to enable me to remove a bridge for careful examination and cleansing, for inspection of the condition of the abutments upon which it rested, and for the giving of treatment if required.

One word more. Dr. Hulick speaks of the use that the casting process has been in crown and bridge work. I make use of the casting process and find it of great value in the construction of crowns and bridges. A method I employ is this: I use what is known as the double system of inlay. For instance, on a devitalized canine, bicuspid, or molar, I place a flat inlay, having a tube attached, and this is cemented fast and accurately to the tooth. The flat inlay is made of 30- to 32-gage metal. I then pour a wax inlay with dowel attached; these are removed, invested, and the casting finished in the usual way. I then assemble the parts of the bridge, solder the parts together and finish and set the same. Thus, you see, I cement metal to metal instead of metal to tooth structure.

Dr. Hulick (closing the discussion). I had hoped to show about fifty slides, mostly comparative, to better illustrate some of the points in the paper.

These pictures would have convinced you of the deleterious effect of badly fitted cap crowns and poorly constructed bridge work. They would have pictured to you some cases of septic poisoning and their correction, and many other failures and corrections. These pictures were to show inefficiency and efficiency, by comparison; to stimulate, not to criticize. They were intended to make us all ashamed at times, and on the other hand, at times, proud—proud to know that crown and bridge work is not all bad, that it can and is made sanitary and serviceable.

Some of the proudest moments of my life have been when I could truthfully say of a service from my colleagues, How beautiful and serviceable! It gives me a thrill of joy, and I never fail to impress patients to appreciate efficiency at all times.

I was glad to hear Dr. Burkhart comment on the golden rule in connection with this work, and I know from my acquaintance with him that he lives up to that rule. The methods he so ably described I have advocated for some years.

Dr. Tileston has taken up some points a little more elaborately than I did in the paper. In a paper of thirty minutes one cannot completely cover the subject. The discussers are expected to take up and enforce thoughts that the essayist has overlooked, or had not the time to consider.

I appreciated Dr. Morris' remarks, because of the fact that I know him to be a successful crown and bridge worker, a man of high ideals and integrity.

In conclusion, I wish to thank the discussers for the generous way they treated the paper, and the audience for the interest taken, and if a few thoughts may be gleaned that will be beneficial, and stimulate to higher ambitions, my object will have been fulfilled.

Dr. Price. The next paper on the program for Section I will be that by Dr. J. V. Conzett, Dubuque, Iowa, entitled "Something on Cavity Preparation for the Gold Inlay," as follows:

Something on Cavity Preparation for the Gold Inlay.

By Dr. J. V. CONZETT, Dubuque, Iowa.

FIVE years of observation and use of the cast gold inlay have demonstrated the fact that it is one of the most useful and beneficial methods for the restoration of lost tooth tissue that has ever been given to the dental profession. It is not only a boon to the dentist, in that it enables him, in a positive way, to fill difficult large cavities in molars and bicuspids with gold without the tremendous stress upon his own and his patient's vital forces, but the ease of the insertion of an inlay from the standpoint of the patient has made the latter largely lose his fear of dental operations, and has been the means of our being able to use gold for the restoration of lost tooth tissue in cases where we were not able to do so before the advent of the inlay, because of the patient's refusal to stand for the prolonged operation under the rubber dam made necessary by the older method.

THE CAST GOLD INLAY *vs.* THE MALLETED GOLD FOIL FILLING.

If the gold inlay were ten per cent. less durable than the gold filling, we would still be justified in using it in a great many cases, because of the great stress that the making of a large gold filling entails in certain nervous individuals. I do not grant that it is any less good than the gold filling, however, for while I know that there is no better preservative of the tooth than a good gold filling, I am confident that a good gold inlay is equally as good as, and a poor gold inlay is infinitely better than a poor gold filling. I once had the pleasure of visiting the office of one of our great gold operators, and while I was there a patient came in for examination who had in her teeth a number of the worst gold inlays that it has ever been my experience to observe. This dentist immediately called our attention to them, and began a tirade against the inlay in general. It was about as fair to compare those inlays with a good gold filling as it would have been to compare a poor, leaky gold filling with a well-made gold inlay. And yet poor as these inlays were —and they were so poor and the margins so wide that I do not see how any operator could possibly have made them from models obtained from the cavity which the inlays were intended to fit—there was no evidence of caries around them, and they were still preserving the teeth. Had they been gold fillings of equally faulty technique, the teeth all around the fillings would have been in an advanced state of caries, but, as it was, the cement was still preserving the teeth. How long it would have done so is a problem, but the probability is that before long there would have been a recurrence of caries around those inlays.

CARE AND SKILL REQUIRED FOR CAST GOLD INLAYS THE SAME AS FOR GOLD FILLINGS.

The making of a gold inlay is an easy method only when the principles underlying the method are properly observed

and carried out. The fact is, that any method is easy when the technique thereof has been mastered, and any method is difficult when the operator is not familiar with its use. The examination that is difficult to the school boy who has not been a diligent student is a snap to the one who has carefully mastered his lessons as he has progressed in his school term; the method of the master is easy to the latter, but is one of profound impossibility to the careless, indifferent botcher. A gold inlay, to be a perfect preservative of the tooth, requires as much care and as perfect a technique as does the making of a gold filling, and the operator who is simply looking for easy methods as a short cut to easy money will find himself running up against innumerable failures and a certain and sure loss of reputation.

Honesty in operative dentistry is the best policy, just as sure as it is in any other business or profession, and the man who carelessly makes a model in an indifferently prepared cavity, casts an ill-fitting inlay for that cavity, and then trusts to the cement to cover up his shortcomings, will succeed for a while, for the cement will do the work that his skill should have done, but in the fulness of time there will be a reckoning, and he who has neglected will not escape the just reward of his misdeeds.

I am led to the foregoing by reason of the fact that there is a disposition on the part of some careless operators to slight their inlays, because they feel that it is not so necessary to be careful of each step as it is in the making of a gold filling. They know that in the making of a filling a faulty technique will immediately, or very soon, disclose itself; but because the faulty inlay does not at once cry out against them, they fall into shiftless and evil habits. Emerson has well said that we are all as lazy as we dare be, and I would warn men that have a tendency to cut corners in the making of their inlays that here they *dare* not be lazy, or the consequences of their laziness will overtake them.

The gold inlay is a magnificent method of restoring the tissue that has been lost by the ravages of caries, and it is so good a method and one fraught with so much good to humanity that I wish to raise my voice against the tendency manifested by some representatives of our profession to employ this method in a careless and indifferent manner, thereby bringing the method into disrepute through no fault of its own. Each step in the making of an inlay must be as carefully considered and as carefully carried out as in the making of a gold filling; and if that is done, and the scientific methods that have been wrought out in the other lines of filling are projected into the filling of teeth with the gold inlay, there will be no occasion for failure or for apology in the use of the inlay method.

CAVITY PREPARATION.

When I say the methods that have been worked out in the making of fillings, I mean the proper cavity formation, the proper contouring of the filling or inlay, the proper saving or restoration of the interproximal space, and the proper finishing of the inlay. It will not be possible for me to enter into a discussion of the whole question in a paper that must, of necessity, be short; so I will content myself with a discussion of some of the points in cavity preparation that I think need emphasis, and point out the importance of a proper contour of the filling.

No one who is at all acquainted with any of my writings on this subject needs to be told that the method that I present is that which the great master of operative dentistry, Dr. G. V. Black, has given us, and I wish at the outset to give him all of the credit for anything that I may have done in the matter of awakening an interest in the subject of a scientific cavity preparation for the reception of the gold inlay.

HISTOLOGICAL AND FUNCTIONAL CONSIDERATIONS ESSENTIAL IN CAVITY PREPARATION.

In the first place, we should all cultivate the habit of carefully studying the conditions that we are called upon to correct. That requires from us a knowledge of the structure, form, and function of the part that we are to restore; for if we do not know the histological structure of the material upon which we are to operate, how can we intelligently fulfil our mission as restorers of that material? How can we in the best manner cut and shape a material of whose structure we are ignorant? We should have an intimate knowledge of the structure and morphology of the enamel, that we might to the best advantage follow the lines of cleavage in the working of the same and in the protection of the structure with our filling material.

We should know the structure of the dentin in a most intimate manner, so that we might know how best to operate upon it with the least pain to the patient and the greatest ease to ourselves. If we thoroughly know the condition of the tooth structure in health, we shall be able properly to differentiate between the pathological and the physiological aspects of tooth structure, and will know when we have reached sound, safe territory, but if we do not know the difference between the sound and the diseased tissue, where will we draw the line in our excavations? This will emphasize the necessity of a careful study of the histology of the dental structures as a preliminary to good restorative operations.

We must know the proper arrangement of the teeth in the dental arch and the relation of each tooth to its neighbor and occlusal antagonist, that we may be able to discern and correct the malposed and maloccluded teeth that we are called upon to restore with a filling or inlay. Someone may ask, What has that to do with the filling of a tooth? I answer, Everything, for if we do not know the proper relation of each tooth to its neighbor and antagonist, how are we to restore a proper condition of approximal relation and occlusal contact? And if we fail in the former, we invite a continual discomfort from crowding of the food between the faulty contacts that our ignorance has led us to make; and if we fail in the latter, we fail to restore to the patient the proper grinding surface which it was our duty to give him.

It is necessary to know the amount and the direction of the occlusal force that the patient naturally exerts upon the surface which we are to restore, for if we do not properly calculate the amount of stress that is to be exerted upon our finished product, we will be liable to error by not providing a sufficient retention and resistance to our filling, and the filling will be displaced, or the whole tooth may be broken.

The prime requisite, then, in the formation of a cavity for the reception of a filling or an inlay, is a proper study of the conditions involved, and then

an intelligent application of the proper methods for the functional restoration of the lost tissue; for if the function of the tooth is not fully restored, we miss that for which our profession was called into existence, and have no right to call ourselves dentists, viz, restorers of lost tooth tissue.

Having a knowledge of the conditions involved in the restoration of a tooth that has been attacked by caries, we apply the principles that we know will to the best extent remedy the evil.

I am led to emphasize the necessity for a study of particular conditions and an individual attention to each tooth that is presented to us for correction—rather than a general lumping of all cavities into one class, with a view merely to the filling of the tooth and the collection of the fee—because I am constantly seeing bad results due to failure to observe or to neglect to correct a condition that made possible the decay of the tooth in the first place; and, of course, if the original condition that caused the defect is not remedied, there is bound to be a recurrence of the defect in a shorter or longer space of time.

"EXTENSION FOR PREVENTION" IN CAVITY PREPARATION FOR GOLD INLAYS.

It is not advisable to go into the etiology of caries at this time, further than to say that we know that caries is caused by a bacterial invasion of the tissues, and that this invasion is found to take place along well-defined areas of the tooth substance. These areas are the ones that are not habitually kept clean, and the consequence of such observation is the slogan of the oral hygienist—"Clean teeth do not decay." If that is correct—and it is, to the extent that teeth surgically clean cannot decay—then it is our duty as operative dentists to make our operations in such a way that the margins of our fillings or inlays will be in the area that is habitually kept clean. This is a reasonable demand, one that all men ought to be willing to subscribe to, and it is all that is meant by the doctrine of extension for prevention. An inlay to be safe must have all of its margins in safe territory; particular attention should be given to the linguo-gingival and the bucco-gingival angles, for while it was a very frequent error in the making of fillings to have these angles so far within the embrasures that they were in unclean territory, and were as a result the places where we found the most frequent cases of recurrence of decay around the fillings so made, it is even more frequent in the inlays that have come to my attention. Some operators seem to think that it is necessary to give the cavity a cone shape, so that the inlay wax will draw and the finished inlay will go properly to place. Such is not the case. As long as there is no undercut the wax will draw, and the best form that we can possibly give to our inlay preparation is the one that approaches the box form, that is, a cavity with flat seats and parallel walls. If the cavity is so made and the buccal and the lingual axial marginal line from the occlusal to the gingival surface is a straight one, and parallel with the one on the opposite side of the tooth—that is, if the buccal and lingual axial lines are parallel—then, if the margin at the occlusal surface is in clean territory, the angles at the gingival surface will also be in safe territory; but the prevalent form is the one that allows the lines to converge gingivally, and the consequence is unsafe bucco- and linguo-gingival angles.

FLAT SEATS.

Another defect that is a common one is the error of making a rounded gingival seat. I have heard operators who ought to know better take exception to the doctrine of flat seats, after I had advocated them in a lecture, and they advised the making of the seats with a round bur, and leaving the shape so obtained as the gingival aspect of the cavity. I have never heard a satisfactory reason given for such a procedure further than that it had been the method of the said operator for years, and he had seen no reason to abandon it. A poor reason, and a poor operator that cannot see a scientific reason for changing a method that he has used, only because he has used it for years! Mechanically it is so obvious that a flat seat offers a firmer base than a rounded one that it is foolish further to discuss the matter. Furthermore, if an inlay or filling rests upon a concave seat, such as would be made with the advocated round-bur preparation, it will have a tendency to rock in the direction opposite to the point of stress that is placed upon it; that is, if the point of stress comes to lie upon the linguo-occlusal portion of the filling, the inlay will have a tendency to yield toward the bucco-gingival surface, and the great stress will be borne by the buccal wall of the tooth, and, if that wall is not strong, it will have a tendency to break at that point, and frequently does so. If the stress comes in the other direction, the force will be delivered upon the lingual wall, and that will be the one that will break; while, if the inlay is firmly seated upon a flat seat, the entire stress will be delivered upon the flat seat, and there will be no tendency to rock and far less probability of the breaking of the wall. All seats should be made flat, not only the gingival seat, but the seat made by the occlusal step. These seats may be made with an inverted-cone bur, which is the way in which I make mine, despite the fact that after I had made that public statement I was told that no man could make a flat seat with an inverted-cone bur and not make undercuts. It is dangerous to say, dogmatically, that no man can do that which you may have failed to do. It *is* possible, and is a very good way to make a flat seat with an inverted-cone bur, but it is necessary to be careful, of course, that no undercut is made. After the seats are made roughly flat with the bur, they may advantageously be planed with a chisel to produce smoothness of the dentin.

FORMATION OF CAVITY WALLS.

The walls of the cavity should be as nearly parallel as it is possible to make them, so that there may be a maximum of frictional resistance to displacement. It is a decided mistake, and one fraught with the largest percentage of failure, to depend upon the cement for retention. We must have cements (and cement and cementation are great problems, which have been very well worked out by our manufacturers), but they were never intended entirely to hold the inlay in the cavity, and that inlay will hold best which has the best mechanical retention. A cavity that is cut sufficiently deep, and the walls of which have been paralleled, will be in no danger of dislodgment from the stress of mastication. Not only must we have flat seats and parallel walls, but, as I have already intimated, the cavity must have sufficient depth to enable the gold to have body enough to make the frictional surface sufficient to do some

good. I have seen a good many inlays fail for the reason that the cavity was hardly cut through the enamel, and, as a consequence, the finished inlay did not have sufficient body to offer any frictional or cemental hold.

INTERPROXIMAL SPACE.

In discussing a lecture which I delivered some time ago, a gentleman said that we wanted to so make our fillings and inlays that the food would be forced into the interproximal space. I did not correct him at the time, for I was sure he did not mean what he said, for it is just that that we do *not* want, and I would not hesitate to remove a filling or inlay that was allowing the food to crowd into the interproximal space, for if it did so it would be a failure. It would cause the patient untold misery, and would set up an irritation of the gingivæ that would end in a bad case of pyorrhea. What we do want, however, and what the gentleman in question evidently meant, is that we want to make our fillings and inlays so that the food will be forced through the embrasures, occluso-gingivally, and thus passing over the margins of the filling keep them in a constant state of cleanliness and polish, with consequent freedom from any danger of a recurrence of decay. This can only be accomplished if we extend our cavities sufficiently far bucco-lingually to bring the margins into the territory that can be so kept clean.

CAVO-SURFACE ANGLE.

The making of the cavo-surface angle is the last, and one of the most important parts of the preparation of the cavity for the reception of any filling. It is important, in that, if there is any recurrence of decay at any time, it is at the cavo-surface angle that the decay begins, and obviously, if this part of the cavity is invulnerable, the whole filling is permanently secure. We have already considered the placement of the margins in safe territory, so that it only remains to take up the subject of the shaping of the margins. We will find that there are two objects to be considered in the shape that we give to the margins in the preparation for an inlay—that of the protection that will be given to the enamel, and the shape that will be given to the edge of the finished inlay as a result of that which is given to the margin.

In the butt margin we find that there is no protection given to the enamel rods in many places, and that, as a result, short rods will fall out under stress and leave a vulnerable place in the margin that will, sooner or later, cause the destruction of the inlay; and, coming down flat upon the margin, it leaves no possibility for the burnishing thereof, and in case of a shrinkage will leave a slight discrepancy between the inlay and the tooth. All of this is obviated in the beveling of the cavo-surface angle, for in so doing the short enamel rods are eliminated, leaving the enamel surface in the best possible shape to resist stress without outside help, and then the resulting shape given to the margin of the inlay —that is, the flange on the margin—not only locks in the enamel rods, but is capable of being burnished down to the margin of the tooth, pinching off the line of cement and hermetically sealing the tooth with gold all around the margins of the cavity. The angle should not be so obtuse that a long bevel will be given to the gold, for if so, the thin flange of gold will not have sufficient strength to resist the stress that may come upon it,

and as a result it will curl up, and defeat the very object it was designed to accomplish. The method of obtaining the cavo-surface angle is to go over the entire surface with a sharp, chisel-like instrument. Dr. Black has designed a number that admirably serve the purpose, and I can do no better than to recommend the marginal trimmers that go with the Black cutting instruments.

The manner in which the filling or inlay is finished plays a very important part in the amount of cutting that is necessary to bring the margins into safe territory, for if the contact is broad and flat, the margins will have to be extended a good deal farther to bring the margins of the filling out of contact with the approximating tooth, but, if the contact is made small and round, and as a consequence all of the surfaces of the filling are sloping toward the contact point, then the width of the cavity need not be nearly so great to clear the margins and have well-defined embrasures through which the food will pass in its excursions over the teeth in mastication, and yet, while passing over the margins with a good deal of frictional force, it will, by reason of the rounded contact, be kept from forcing itself into the interproximal space.

There are so many problems entering into the making of a good inlay that one might spend an entire day in attempting to discuss them. I have therefore attempted to emphasize only a few of the mistakes that have been forced upon my attention by the constantly recurring failures which are being experienced by operators in all parts of the country.

A careful study of all the conditions that present themselves to us, an individualizing of each operation that we make, a careful employment of the knowledge of cavity preparation that Dr. Black has given us, and a restoration of contact and interproximal space, will make for such an improvement in the general operative technique that, if this paper will in any measure contribute to the general adoption of the above principles, it will amply fulfil its purpose.

Discussion.

Dr. Thos. P. Hinman, Atlanta, Ga. In discussing Dr. Conzett's paper I shall attempt merely to enlarge upon some few items which he has spoken of. In regard to the question of mastering the technique, how frequently, in the construction of gold inlays, beginning with cavity preparation, we miss important points in the technique, and this paper goes so fully into them that it should recommend itself to everyone. As to the influence of the gold inlay on other operative work, I am reminded of the remark of a friend of mine, who said that to him the gold inlay was really a godsend; that he could work at the chair in the morning, make the inlays, and set a dozen of them during his dinner hour. Such an operator invites failure, for it is only by the greatest degree of care in our technique from the beginning to the end that we are able to make a nearly perfect inlay.

As to the methods of cavity preparation, there is just one point that Dr. Conzett failed to bring out as strongly as I had hoped he would, viz, in regard to flat floors and smooth axial walls. How frequently we find that the axial walls have been left rough! If you do not think you leave this wall rough, examine the portion of the wax that comes in contact with it, and see how frequently you find slight excrescences on it. These are formed in the mold, which is exactly the opposite of the wax, and when the

molten gold flows to place, it simply rubs and smooths the corners down, and the inlay does not fit. That is one of the main faults in cavity preparation for inlays. The necessary smoothness of the walls, I believe, can be most readily obtained by the use of carborundum stones.

As to margins, Dr. Grieves has called our attention to the fact that, in butted joints in inlay work, the cement is pumped out owing to the suction force of mastication, and that in itself, I think, is a strong enough recommendation for us to bevel or trim the margins in such a way that the cement will be held by the gold lap. Dr. Conzett correctly emphasized that short enamel rods, if left, will break away. The fact that the cement will be pumped out under the influence of mastication makes it doubly important that these short rods be removed, and the margins beveled.

In regard to the question of extension for prevention, I remember when the subject was first discussed years ago, after Dr. Black had brought it out, one of my friends—a man of the old school—said that extension for prevention was extension for destruction. While I realized what a great mistake he was making, and what a great truth Dr. Black was preaching and teaching, still I am convinced that extension cannot be done empirically, but that the extension of each particular cavity must be made according to the anatomical form of the tooth. In some cases, especially where the contact surfaces are very flat, we require much more extension than if the contact surfaces are very slight. These extensions are just as important in all gold inlay work as they are in other filling operations.

In reference to the use of the inverted-cone bur in making the gingival walls of the cavity, I do not think that, in the hands of the average operator, it will serve the purpose so well as the square-end fissure bur, with which there is less chance of making undercuts.

In reference to trimming enamel margins, Dr. Conzett recommends Dr. Black's marginal trimmers, which are wonderful instruments, but recently I have tried a new set of instruments, *i.e.* Dr. Wedelstaedt's trimmers, and I find them much more adaptable.

The essayist failed to emphasize that we are very much mistaken when we assume that the strength of cast gold is equal to that of hammered gold. Cast gold does not have the same strength, and in large cavities where the occlusal surfaces are involved, unless we add some material to the pure gold to make it harder, it will not stand the stress of mastication, because of the fact that it has practically little more strength than lead. But if we add five per cent. of platinum or ten per cent. of pure silver, we shall not affect the casting qualities of the gold, but make a much harder filling and one that will stand the stress of mastication.

In regard to retention, I see many cases in which inlays have failed on account of the mechanical retention; the operators are expecting the cement not to hold the filling in, but to resist the entire stress of mastication. It will not do it. There must be mechanical retention, and as I have often said before, the cavity should be so formed that, when the inlay is in position, without being cemented, it cannot be dislodged by the force of mastication. When this rule is followed carefully, the cement and the

proper burnishing of the margins will make the finished filling more perfect than one made by any other method.

Dr. R. H. Volland, Iowa City, Iowa. The main points of Dr. Conzett's essay are well selected, and to my mind it is timely to emphasize and discuss them. Many more factors entering into the making of a good cavity preparation for a gold inlay might be mentioned, but the essayist was shrewed enough to select those broad and general points upon which observing operators could not disagree. Such a paper is very difficult to discuss, unless the discusser merely reiterates. I agree on the whole with the writer's ideas, and shall confine my remarks to some comments on the various portions of his essay.

The operation of restoring lost tooth substance by means of a filling or an inlay may be roughly divided into three steps, namely, (1) preparation of the cavity, (2) adaptation of the filling material, and (3) finishing of the restoration.

These various steps are all interdependent; it is impossible to draw a dividing line between them. In many instances the type of cavity preparation which it is possible to make will determine the kind of filling material. In all cases the kind of filling material to be used will determine the type of cavity preparation to be made—so illustrations of interdependence might be multiplied. Each step must be honestly and faithfully performed, if the finished product is to be what it should. It is absolutely impossible to make a creditable inlay operation in a poorly prepared cavity. True it is that a poor inlay may be made for a well-prepared cavity, but we are now discussing cavity preparation and not the adaptation of the filling material; a well-prepared cavity is the first and most important step toward a successful operation; it bears the same relation to the finished operation that a well-made foundation bears toward the permanence of a building.

Inlay operations that have come under my observation may be divided into three classes. The first are those made by an operator who is satisfied with any cavity form which allows him to cement-in an inlay. Such an operator uses the gold inlay as a short cut to the dollar.

The second class of operations is made by an operator who is essentially a mechanic. He prepares the ordinary cavities well, and makes good inlays. He has fixed in his mind the typical cavity forms and has sufficient mechanical ability to follow them out. But when a case presents which is just a little out of the ordinary, then this sort of operator is found wanting; even if he has a knowledge of the scientific factors entering into cavity preparation, he cannot apply them so as to take care of these partially typical cases.

The third class of operations is made by an operator who has a keen sense of the factors entering into a cavity preparation and also possesses sufficient mechanical ability to apply them. Such an operator sees all the mechanical requirements of the case; he thoroughly appreciates the anatomy, histology, and pathology of the tooth and the surrounding parts, and gives all these factors due consideration. Then, above all, his system of cavity preparation is based upon principles which are founded upon scientific facts. The partially typical case is met by this operator, and is solved by his principles of cavity preparation. True it is that this operator prepares the typical cavity, but his system of cavity preparation is not a collection of set cavity

forms. Each case is a problem unto itself, and is treated individually. In this last class of operations one will find the largest percentage of permanent and creditable work.

To my mind the principles of the mode of cavity preparation that come most closely to fulfilling all the requirements were given to the profession by Dr. G. V. Black. This system has been thoroughly tested for years with the amalgam and gold filling, and has been found to be good. These same principles that have made for good and for permanence can be applied to inlays.

I cannot understand why any dentist who is familiar with the facts of the superficial spreading of caries can object to practicing the principle of extension for prevention in preparing a cavity for a gold inlay. Extension for prevention does not mean a ruthless cutting away of tooth substance. It is founded upon everyday observation, and means merely conservation in dentistry. Some men argue that the cemented margin of a gold inlay is not as susceptible to caries as the margin of a mechanically adapted gold filling. Granting that this be true, let its advocates remember that caries occurs in susceptible *areas* as well as at susceptible *points,* and it would be very unwise to leave the inlay margin in this susceptible area. Furthermore, the cement can produce no immunity except to that part of the tooth which is covered by it. To my mind it is just as good dental practice to follow out the principles of extension for prevention in preparing cavities for gold inlays, as it is good surgery to remove all of the appendix when performing an appendectomy, regardless of whether the entire appendix or only its free extremity is involved.

No one who has studied the comparatively tremendous forces exerted in mastication should be unwilling to subscribe to a system of cavity preparation that provides for a good firm seating and a logical distribution of stress over the remaining tooth substance. Mechanically, flat planes of the cavity walls meeting each other at as nearly right angles as possible answer best for the accomplishment of resistance form. Slightly convex seats, such as pulpal and gingival walls, are not objectionable, when it would necessitate the needless sacrifice of tooth substance to make them flat. Architecturally or mechanically, these slightly convex planes perform about the same function as a flat wall. We should have little respect for the architect who specified a foundation suitable for a two-story frame house for a twenty-story office building; yet every day we observe inlays made by operators who depend upon cement to hold them against many pounds of strain.

There is much to say in regard to convenience form, retention form—not angle retention—and preparation of walls and margins; however, I wish to emphasize just one step in the technique of finishing walls and margins. To my mind the sharp hand-cutting instrument, held with a firm grasp and used with a planing motion, is far superior to any rotating instrument, such as stone disks, etc., for this purpose. In machine shops the planer has long superseded any attempt at using a rotary tool for cutting flat surfaces on hard substances.

Dr. Conzett mentioned the necessity of properly finishing the set inlay. I wish to emphasize that suggestion. Why should a dentist spend energy in preparing a cavity and adapting an inlay, and then not finish the restoration? Cleanliness, if not the operator's artistic sense,

should require a smooth surface for the inlay. The contour should also be looked to very carefully. In approximo-occlusal inlays the maintenance of an interproximal space of normal mesio-distal diameter is very essential, if the septal gum tissue is to be kept normal. The embrasures should be open and free, and the contact brought down to a rounded point level with the occlusal plane of the inlay. You will recall that the contact points of molars and bicuspids are located well toward the buccal surface in the natural teeth. The artificial contact point should be moved slightly toward the lingual surface so as to make the buccal embrasures more nearly of the same size and depth as the lingual ones, thus permitting the food to sweep equally freely through them, so that the buccal and lingual margins of the inlay on the approximal surface may be cleaned. This movement of the artificial contact point lingually is of the utmost importance.

I have been teaching the making of gold inlays in our college clinic for several years, and in making them in my own practice I have had gratifying results so far as permanence and service is concerned. It is a great pleasure to have Dr. Conzett, long a leader of the gold-filling enthusiasts in my state, express to you, in so good form, the doctrine which I have been trying to preach, though less eloquently than he, and to practice for the past eight or ten years.

Dr. Arthur D. Black, Chicago, Ill. I had not intended to discuss this paper, and therefore shall mention only two points. Dr. Conzett himself reminded me that he forgot to mention in his paper an item of much importance, viz, the finishing of the gingival margin of approximo-occlusal inlays. All will probably agree that there are more failures of proper fit and proper finish at this margin than elsewhere in fillings of this type. The failures of fit are often due to neglect to trim the wax model properly. When the wax is first pressed down into a cavity, a line is made on the wax, indicating the margin of the gingival wall of the cavity; later, when the patient bites down upon the wax, there is a movement of the wax outward from the margin of the gingival wall, and sometimes there is not a very good line left in the wax that remains at that margin. There is liability of mistaking the first line, which has moved outward, for the right one, and, if the wax model is trimmed to that, wax will be left projecting, which will result in a similar projection of the inlay. The finishing of this margin is of the utmost importance to the health of the interproximal gum septum, a point which has been emphasized by Dr. Volland. The dental profession must pay more attention to the slight inflammations of the gingivæ, and nothing is of greater importance in this connection than the proper finishing of the gingival margins of inlays, as well as of all fillings.

The other item I wish to speak of, which is closely related to the first one, is the contact point. Dr. Hinman called attention to the difference between the strength of pure gold cast and pure gold malleted. If two cubes of pure gold, one cast to a specific gravity of 19, and the other malleted to a specific gravity of 19, are each subjected to three hundred pounds' stress, the one which has been cast will be compressed about five times as much as the one which has been hammered. It is important for us to appreciate this when placing gold inlays upon which much stress is to be exerted, not only because there may be a movement of the mass of the gold, especially at the

margins, but because the contacts are gradually worn away by the bucco-lingual movement of the teeth and become worn flat, unless a substance that is harder than pure cast gold is used.

Dr. Volland spoke of moving the contact point slightly lingually in approximal restorations in bicuspids and molars. He also said, if I am not mistaken, that he places the contact point even with the occlusal plane of the teeth. This is a mistake that is very commonly made in approximal inlays. The normal position of the contact point is a considerable distance gingivally from the plane of the occlusal surfaces; the occlusal surfaces of the two teeth curve into the interproximal space to form the contact point. Suppose an inlay or a filling is placed in the mesial surface of a first molar, and the contact point is made even with the occlusal surface—when the contact is normally one-fourth or one-third of the length of the crown from that occlusal surface. Is it to be expected that the gum septum will stretch out and reach up to that new contact point? I think that is too much to expect of that tissue. By raising the contact to the plane of the occlusal surface, an area of liability to caries is created on the distal surface of the bicuspid, just gingivally of the new contact point, which cannot have the protection of the gum septum, and which would not be there if the contact point were in the right position. The change in the position of the contact point also reduces the amount of food that passes through the embrasures, and reduces in like proportion the cleansing effect, which means that such change in the position of the contact would necessitate wider cutting of the cavity bucco-lingually, to place the margins in self-cleansing possitions.

Dr. W. E. Lundy, Memphis, Tenn. This subject appeals to me very strongly. There are just one or two points that I should like to mention which seem to have been passed over. The necessity of a correct contact point has been impressed upon us. Now, in making the wax pattern we very frequently find, after the pattern goes home, that we do not have the contact point as we wish it to be. A simple method of obtaining it correctly is to lay the gold inlay, after it has been cast, on a block of asbestos, place a little piece of solder on the point, and flow it so as to form the desired contact point. It can be made as tight as you wish, and can be ground until the desired amount remains between the teeth. Sometimes it is very difficult to get the proper preparation of cavities in sensitive teeth, unless we use nitrous oxid and oxygen analgesia which is in such common use now. It is also rather difficult to obtain sufficient separation, therefore the wax is difficult to remove without distortion unless the cavity is prepared in the shape desired. The wax model may be taken out of the cavity, and any little undercuts that may exist may be removed; then the wax model is replaced and re-burnished, and it can then be removed without trouble, and all the margins can be finished nicely.

In finishing the cervical wall of the inlay, I have found that the patient will push out the wax and efface the line of the margin, as mentioned by Dr. Black. While the patient holds the teeth together, the margin can be finished with some files devised for treating pyorrhea by Dr. Towner, with which you are all probably familiar, and then the wax model can be removed in perfect shape.

Dr. Conzett (closing the discussion). There are only one or two points that I would like to bring out in closing—one in

regard to finishing the gingival margin, as mentioned by Dr. Black. I asked Dr. Black to speak on that item because I entirely forgot it in my paper, although it is one of the most important steps in making an inlay. More gingival inflammation is produced by improperly fitting bands, crowns, and overhanging margins of fillings than by almost any other cause, and I am glad that Dr. Black emphasized this fact.

I am glad that Dr. Hinman spoke of the difference between cast gold and malleted gold, stating that pure cast gold is too soft for an inlay that it is to receive stress. Pure cast gold may be used in some cases where no stress is to be brought to bear on the inlay, but if there is any stress whatever—and nearly every inlay receives such stress—that it must be made of some such metal as Dr. Hinman indicated.

Dr. Black also spoke of the fact that in making a wax model, after pressing the wax in the cavity and allowing the patient to bite on that, the model becomes distorted. I have found this to be true in many instances. I rarely allow the patient to bite on a wax model now, because of that distortion, which I have found it difficult to get rid of afterward. When the wax is pressed into the cavity, I allow it to cool. Taggart wax hardens at the temperature of the mouth, and need not be chilled. Chilling, in my opinion, affects materially the shrinkage of the wax. I therefore do not chill it, but allow it to harden and then trim the occlusal surface, thus getting away from the distortion caused by the patient's biting on the softened wax. Instead of allowing him to bite into the wax, I allow the patient to try it very gently, and then trim the wax to proper occlusion.

Dr. Black spoke of the contact point. Dr. Volland did not mean what he said, for he would not place the contact point right on the occlusal surface. The approximal surface should, as Dr. Black pointed out years ago, slope toward the contact point in all directions. From the occlusal surface this contact point is also slightly rounded, so that, if sloped as Dr. Volland shapes it, it is not directly on the occlusal surface.

A Member. What would be your opinion as to using 22-karat gold instead of pure gold?

Dr. Conzett. I use 22-karat gold in all work on the occlusal surface which is to bear stress, but generally I use 23-karat gold.

The next order of business as announced by the Chairman was the reading of a paper by Dr. C. M. McCauley, Abilene, Texas, entitled "The Great Need of Improvement in the Manufacture of Dental Alloys," as follows:

The Great Need of Improvement in the Manufacture of Dental Alloys.

By C. M. McCAULEY, B.S., D.D.S., Abilene, Texas.

THE subject of this paper will be treated under three headings, namely—(1) The present status of the amalgam situation. (2) What has been done toward the corection of existing evil. (3) Prospects of improvement in the future.

REITERATION OF A FEW STATEMENTS CONCERNING AMALGAMS.

My experience during the past year prompts me to emphasize certain points touched upon in my paper—which was read before Section III of this association last year and published in the February 1912 issue of the *Dental Cosmos*, p. 174. Namely:

I still maintain that the method of making and balancing alloys as discovered by Dr. G. V. Black is the only scientific and dependable method which has been introduced up to this time.

That shrinkage, flow, weakness, and excessive expansion are serious faults found in most amalgams, and that of these faults shrinkage is the worst.

That silver, tin, and copper are the only metals that should be used in alloys.

TWO MAJOR ELEMENTS IN THE MAKING OF EVERY GOOD AMALGAM.

There are two major elements which enter into the making of every good amalgam operation, namely, a good alloy and correctness of manipulation. Where either of these elements is lacking, even in a slight degree, the result fails to reach that degree of perfection which characterizes efficiency in any scientific undertaking. When one appreciates the importance of each of these elements, then considers the vast number of operations done with amalgam, and observes the large percentage of failures therein, no apology for presenting a paper on this subject at this time will be necessary.

IMPORTANCE OF THE SUBJECT OF AMALGAMS.

I do not hesitate to say that, in view of the remarkable deficiency of many commercial alloys, and the seeming indifference on the part of so many dentists, there is not a subject before us today that calls for closer study, better teaching, and more profound investigation than the subject of amalgam.

ONLY ONE OUT OF SIX ALLOYS FOUND GOOD.

According to tests which have been made up to the present time, only one out of six alloys has proved good. In other words, the man who is a capable amalgam operator and selects his alloy from the market stands one chance in six of securing good results! To make it still worse, many men believe in an alloy and earnestly advocate its supremacy when, as a matter of fact, it may be unfit for use as a filling material. For example, one man brought in a specimen

of alloy, in which he had the utmost confidence, to be tested by the committee. He had been searching for several years for his ideal alloy, having tried a great many kinds, and the specimen presented he honestly believed to be the best of all. In making the tests, he watched the readings of the micrometer very closely. The first filling showed shrinkage. Not being satisfied, another was made, and then a third; still shrinkage occurred. Three months from that time these same fillings had expanded to an extreme degree. This operator was one of the leaders in his state, and the alloy tested is being sold in many states, thus bearing out my claim that the most vigilant observation of our best operators is insufficient to determine the quality of dental amalgams. No one should be blamed for such an attitude as is assumed by this man (and there are many just like him), because he has no means of knowing of such defects as can only be found by the micrometer, the microscope, or long years of clinical experience. No one will question the assertion that clinical experience throughout the country is far from satisfactory, and is of only secondary importance in determining the quality of alloys.

THE MANUFACTURERS' SHARE OF BLAME.

In bringing about a reform in the present amalgam situation we must give the manufacturer his share of the blame. Many of them seem to be lacking in knowledge of their business. And yet the strongest claims for superiority of their products are set forth in glaring advertisements; circulars are sent broadcast over the land, telling of the long years of experience, giving testimonials from the leading men, etc.

"NAMELESS" ALLOYS.

It is estimated that over two hundred different brands of alloys are made and sold in the United States today, of which less than one-fourth bear the name of the maker. In most states there are local dealers in dental supplies who have one or more alloys made, and give them some catchy name. The maker of these alloys is aware of the dealers' ignorance and perhaps indifference as to the quality of the alloy, and he, the maker, being in no way responsible to the dentist for the quality, the main incentive to honest and conscientious manufacture is utterly lost. This class of alloys composes practically three-fourths of the entire market. Not one of this class has been found to be up to the standard—nay, worse, all of them which have been tested in our experiments have been found bad.

UNSCIENTIFIC ALLOYS.

Of the remaining alloys, which bear the name of the maker, more than three-fourths are still made by unscientific and haphazard methods. Some adhere to the use of zinc, some to that of gold, and others to various modifying metals which are quite detrimental. One manufacturer claims to make twenty different alloys, each from a separate formula—none of which, judging from the formulæ he gives us, could be expected to stand the micrometer test. Some manufacturers not only use ingredients which are positively harmful, but some of them herald their use throughout the country in glaring headlines on advertising matter, claiming originality, new discovery, superior quality, and so forth—and the dentist believes, hence the sale of the article.

Of the remaining small number which

are balanced by the micrometer and properly made, a few, a very few, are composed of the right materials. Is it any wonder that some of our best operators frown upon amalgam? Is it any wonder that results as a whole are so far from perfect?

The above conditions have produced innumerable unnecessary failures in our work, and have stood in the way of good being done in other lines. Some of our best operators will not use amalgam because they have failed to render the best service with it. The trouble was a defective alloy. The best efforts of our best operators will fall short of perfection unless the amalgam is perfect. Make the alloy right and put it in the hands of an efficient operator, and the result will be right.

What has been done toward the correction of existing evils? So far as the writer is aware there has never been a systematic examination made of any considerable number of alloys with a view of ascertaining their physical properties and reporting the same to the profession.

RESULT OF INVESTIGATIONS CARRIED ON IN SEVERAL STATES.

Such work was begun a year ago, when Section III of this association requested the writer to co-operate with a committee appointed for that purpose. Owing to an oversight the appointment of this committee was not officially confirmed. The work has consequently been deferred, pending confirmation of the committee appointed.

The writer was invited to the states of Iowa, Nebraska, and South Dakota in May of the present year to do some work along this line. At my request, a committee was appointed in each state to assist me, and to check up my notes. The plan adopted by each of these committees was to present the alloy to be tested in sealed envelopes, bearing only a number. The name was unknown to us until after the tests were made and recorded. Special effort was made to do all the work in a strictly fair and unbiased manner. The tests made in these states were highly significant, because the standard of efficiency among the members of these societies is very high, thus indicating that the highest-grade materials are in use. The specimens tested were supplied by the best men of these states. These specimens included many, in fact most, of the alloys which enjoy a wide reputation. We presume that the cream of the market was represented in the specimens thus secured. Added to these specimens are a few brands sent me from different sources and tested by me in my office, bringing the total number tested to thirty-seven. Out of this number only six or eight brands proved to be good, or medium good. All the rest should be eliminated from the usable class. Twenty-two out of the thirty-seven show excessive expansion, ranging from 5 points up to 342 points. Several fillings showed over 100 points expansion. Dr. Black says that 2 points expansion is desirable. We may safely say that expansion in excess of 5 points should be avoided, and that shrinkage in the slightest degree is harmful. To be on the safe side and to give every alloy a fair test, we regard 1 point in all tests as coming within the range of unavoidable error, hence where only 1 point shrinkage is shown, we do not place the alloy on the condemned list.

The number of usable alloys taken from over the country would probably be less than one in twenty.

THE PROSPECTS.

The future of dental amalgam depends upon the action of the dental profession. We should take the initiative. If let alone, conditions will, in all probability, grow worse; if we take the aggressive, much good can be done. If the work is ever completed as it should be done, co-operation is imperative. A vast amount of work and considerable outlay of money will be required. Of the two hundred alloys on the market at least four specimens of each should be secured from different sources. Each of these should be carefully tested for shrinkage, expansion, strength and flow. If everything were in readiness to begin, this work would require the constant attention of one investigator for several months. Besides the time and expense, there is a responsibility attached to making such a report, which one man would not care to shoulder.

The accompanying brief report of partial tests made is presented only to give this body an idea of the deplorable condition existing. It represents only a beginning.

The tests made are incomplete, therefore they cannot be absolutely relied upon.

Certainly the worst are condemned without further work, but those which appear good might not prove so if tests for flow and strength were made, and the tests were repeated a sufficient number of times. In view of the incompleteness of this report in some respects, I ask that it be accepted only for what it is, and that judgment be withheld pending further investigation, in the event that such action is officially taken by this association.

Discussion.

Dr. C. M. McCauley. I have here a table of results of experiments made with a few alloys, and I will read portions of it to give you an idea as to what the committees in the states visited have done. I have arranged the report in such a way as to show where the testing was done, the amount of shrinkage, the amount of expansion, and the time that the movement was followed up.

One point in the table means one ten-thousandth of an inch. The fillings were made in Wedelstaedt steel tubes. The cavity in each was 33/100 of an inch in diameter, and 38/100 of an inch in depth. At the bottom of the cavity is a groove, in which the amalgam is packed to prevent movement toward the orifice of the cavity. In other words, the filling is held in the bottom of the cavity so that the expansion is indicated by the protrusion of the filling from the cavity, and the shrinkage is indicated by its drawing into the cavity or away from the margins, either of which movements may be detected by the micrometer or microscope. The microscope is used to verify the work of the micrometer in both expansion and shrinkage movements.

The first test I will mention is that of a specimen of *Rego*, which showed no shrinkage, 4 points expansion, time ten days. Two other specimens showed practically the same result.

Crandall's Alloy. No shrinkage, 1½ points expansion, time seven days. Another specimen of Crandall's showed no shrinkage, no expansion, time one and one-half months. Another specimen showed no shrinkage, 3 points expansion, time one and one-half months.

Another specimen showed 1 point shrinkage and 1 point expansion, three months' time.

A specimen of *Fellowship* tested in Lincoln showed no shrinkage, 2 points expansion, and read for two months. A specimen of Fellowship tested in Des Moines showed no shrinkage, 4 points expansion, three months' time.

Twentieth Century. Shrinkage 1 point, expansion 1 point, time ten days. Another specimen (test made at Lincoln), 1 point shrinkage, 20 points expansion, two months' time. Another specimen, 1 point shrinkage, 2 points expansion, three months' time.

Science Alloy. Shrinkage 1 point, expansion 6 points, four months' time. Another specimen, no shrinkage, 2 points expansion, two days' time.

Absolute Alloy. Shrinkage 1 point, 3½ points expansion.

All of these that I have read show only slight movement, and, if repeated tests showed similar movement, they could be relied upon in practice.

Dr. CONZETT. Will you explain how you have expansion and shrinkage in the same filling?

Dr. McCAULEY. I have found in testing amalgam fillings that most of those that shrink at first show subsequent expansion. The greater part of shrinkage takes place in the first two hours. When expansion follows, it is sometimes slight, and again it reaches an enormous degree. In doing this work we made it a point to measure each filling in the micrometer, two or three times the first two hours; after that every two or three hours for the first day, then every day for eight or ten days if possible, and about once a week after that.

Dr. MOFFITT. Will you tell how you verify the micrometer with the microscope?

Dr. McCAULEY. When the expansion or shrinkage reaches as much as 4 points, the binocular microscope will detect it very readily, the shrinkage being shown by the amalgam drawing away from the margins or into the cavity, and expansion by protrusion therefrom.

Dr. MOFFITT. What size cavity?

Dr. McCAULEY. 33/100 of an inch in diameter.

Dr. MOFFITT. What is the magnification?

Dr. McCAULEY. Fifty diameters. Under such a microscope 4 points can be seen by the untrained observer.

Next we have a specimen of *True Dentalloy,* which showed no shrinkage, 35½ points expansion. Another specimen, no shrinkage, 2 points expansion. Another specimen, 1 point shrinkage, 20 points expansion, two months' time. Another specimen, 1½ points shrinkage, 5½ points expansion.

Globe Alloy. Shrinkage 11 points, 1½ points expansion, time ten days. Another specimen of Globe, 6½ points shrinkage, 1½ points expansion.

Dr. TILESTON. Do you count the expansion from the minimum or rest point?

Dr. McCAULEY. We count from the point of maximum shrinkage. For instance, we have a shrinkage of 6½ points, and after that the material expands 1½ points, leaving 4 points of shrinkage from where it started.

We have a specimen of what is called *Fox White Alloy,* which showed a shrinkage of 5½ points, and expansion of 2½ points, in ten days. *Standard,* shrinkage 6½, expansion ½, in six days. *Sterion White,* shrinkage 3½, expansion ½, in seven days. *Pure Dentalloy,* no shrink-

age, 12 points expansion, in two months' time.

	Shrinkage.	Expansion.
Blanco	5½	4½
Gold Dust	9½	1½
Gold Premium	0	5
Perfection	½	8½
Improved Premier	3	103
Regal	0	60
"	0	56
P. D. Q.	2	1
Monarch	4	1
"	2	1
Fox Pyramid	4	17
" "	2	24
" "	6	142
Roberts' Gold Bullion	2	2
Keller's No. 3	0	29
M. O. B. Black's	0	34
" "	4	0
Garhart's Regal	4½	17½
Fidelity	3	9
Harper's	1½	12½
"	3	4
Security	0	18
Garhart's Gold White	4	342
Par Excellence	0	62
Montague's Gold Alloy	5	0
Rutherford's No. 10	6	5
Newborn's	2	17
S. S. White Special	0	21
Odontoid	4	0

It is not intended that the practitioner should accept the above figures as conclusive and select his alloy therefrom, but they are submitted here only to give dentists an idea of the necessity of a thorough and exhaustive series of tests covering the entire alloy market. Many tests of each kind must be made before a reliable conclusion can be reached.

Dr. J. A. Bliss, Ruthven, Iowa. I had the pleasure of being the chairman of the committee which tested these alloys in Iowa. The results were very surprising. We should remember in this connection the statement of Dr. Black in regard to alloys, mentioned by Dr. McCauley, that they should show no shrinkage, and not above from four to five points of expansion. Even though you realize that of this list of alloys tested very few come near to what alloys should be, still we must remember that the formula of many of those that seem to have reached the point of excellence demanded by the profession shows up improperly, no matter what the tests have shown; and when that is true, that alloy must be changed. For example, Dr. Black makes the statement that the only three elements that should enter into a perfectly good alloy are silver, tin, and copper. He emphasizes that any zinc introduced into an alloy is detrimental, owing to the fact that it does not alloy uniformly with other metals, and consequently, in one portion of one and the same ingot there may be a percentage of zinc above what is intended, and in another portion of that ingot there will be less zinc than intended, and this necessarily results in an uneven alloy. Dr. Black therefore excludes zinc as being detrimental and undesirable, and we are forced to the view that any alloy that contains zinc should be excluded from our tests, which means all but about two or three. This is alarming, when we consider the fact that of all the fillings made in the United States, at least seventy-five per cent. are made with amalgam. The investigation of this question is merely begun. I would be more than pleased, and Dr. McCauley no doubt concurs with me, if the National Dental Association would take some action, and that a committee be appointed and an appropriation set aside for further careful investigation of alloys with an eye to perfect fairness and justice. If the alloys that we are using are of no use to us, we want to know it; and if there are alloys that are what they should be, we want to know that.

Very recently we have received circulars from alloy-makers, who evidently

have been stirred up by this movement, and it is amusing to read the many various statements of different makers in substantiation of the claim that their alloys are perfect. These circulars consist mostly of testimonials from prominent dentists, who state that they have been using such and such an alloy for a number of years with perfect results. With all deference to the operators who give such testimonials, I wish to go on record as saying that these recommendations are not worth the paper they are written on, for the reason that any such tests made clinically in the mouth are not scientific, and not dependable. We cannot depend on tests made by dentists in the mouths of patients. The only tests that can be relied upon are those made scientifically with the aid of accurate instruments. These tests are valuable, but anything outside of that is absolutely valueless.

We also must bear in mind, when any of these alloy-makers tell us that their alloy contains gold or platinum, that Dr. Black makes the statement that these metals are a detriment to an alloy, and of no advantage whatever. With regard to gold, I happen to know an alloy that contains a large percentage of gold, and we have made tests of this alloy, which brought out the fact that it shows a large amount of shrinkage, and fails to respond with the proper amount of expansion.

Regarding gold and platinum alloys, the statement is being made that these metals improve the color of the amalgam. All we have to do to dispose of that point—aside from the fact that it causes more shrinkage—is merely to remember that anything less than 18-karat gold will not be free from discoloration in the mouth.

Dr. Conzett. Twenty-four karat will discolor when mixed with mercury.

Dr. Bliss. That is a good point. We want to remember the plain fact that we, as the dental profession, should stop paying for stuff that is not worth anything as a filling material, and make the manufacturers furnish us with a suitable material. It seems to me that our way is clear. We are merely at the beginning, and it is unfair to condemn any alloy, or any maker who acknowledges the shortcomings of his product and stops furnishing such material.

Dr. McCauley speaks of the responsibility of making these tests. I assure you that it is a great responsibility, and if you knew some of the persecutions endured by him since he began these investigations, you would be indignant. It is a shame that one man should bear the brunt of these attacks. In justice, therefore, to Dr. McCauley and his fellow investigators, these tests should be made under the supervision of the National Dental Association or some state society, as a part of the society's work, thus relieving the investigators of any personal responsibility.

In closing, I wish to repeat that this work is merely begun, and I am sure that all appreciate what Dr. McCauley has done, and I hope in the future the society may see its way clear to lend assistance in this task.

Dr. R. E. L. Strickler, Bridgewater, Va. I would like to ask which of the alloys mentioned are the best to be used. I made some notes as best I could, while Dr. McCauley was reading, but he has the full report, and perhaps he may have in his mind several that he could recommend as the best.

Dr. McCauley. The question, as I understand it, is—What is the best alloy

to use? I have been asked this question a number of times wherever I have spoken on amalgams, and I never have been able to answer it. I give you the figures and let you form your own conclusion. Any degree of shrinkage and any degree of expansion exceeding 5 points is detrimental. Those alloys in this list which come within that range of shrinkage and expansion may be easily determined by anyone in going over the list. Yet here is a case of four or five tests being made of a certain alloy, and all but one showed the alloy up well, that is, no shrinkage and less than 5 points of expansion; yet, in one of these tests, a specimen of the same alloy showed expansion of 20 points. I should hesitate, therefore, to say that this is not a good alloy, after such a small number of tests. If, after having made many careful tests of this same alloy, I find that the expansion and shrinkage will reappear time and again, and that the results are varying in different fillings, I shall be able to say that this alloy is not dependable. Again, if I find, in test after test, that this alloy shows no shrinkage and little expansion, then I shall be able to say that this alloy is good, and no better can be found. But we have not reached that point, because the tests I have made are incomplete. I have made only a few tests and none of these tests are complete. It would, therefore, be an injustice to other manufacturers, who perhaps are producing a good article, to point out five or six alloys as being satisfactory and recommendable. We must obtain results in the best way possible, without any undue hurry, and wait until thorough and conclusive tests have been made, and until we have enough data before us to determine whether or not a certain amalgam is good or bad.

A Member. Tell us what proportion of mercury you use, and how you mix amalgam?

Dr. McCauley. That varies with the alloy used. A balanced alloy, composed of silver, tin, and copper, requires about 55 per cent. of mercury and 45 per cent. of alloy. This proportion varies in that alloy as it grows older.

A Member. Do you get the proportions by weighing?

Dr. McCauley. Yes, by weighing, and observing the working properties of the alloy.

Dr. Koser, Harrisburg. What attention do you give to the amalgamation of the alloy? Say you make three tests, do you try to give the same attention to amalgamation in each test?

Dr. McCauley. Yes, the idea being to obtain uniform results, if such can be obtained with the alloy in question. Of course, if we use varying proportions of mercury and a varying technique, we should not expect uniform results. In order to make tests and tabulate the results, we have to determine whether or not these tests will repeat themselves, and must therefore use as nearly as possible the same technique.

Member. What effect has age on the alloy?

Dr. McCauley. Age makes no difference in shrinkage or expansion. It affects, however, the amount of flow and strength; as it grows older, the alloy grows weaker. In my paper of last year (*Dental Cosmos* for February 1912, p. 174) I said that every alloy should be dated by the manufacturer, viz, the date should be placed on every batch before it leaves the manufacturer, so that

the dentist may know whether or not the alloy has grown old.

Dr. CONZETT. Dr. Ward found years ago that fillings made up a certain length of time increased in strength, but after a certain time began to decrease in strength. Have you made any tests along that line?

Dr. MCCAULEY. The question is whether amalgam deteriorates in strength as it advances in age. I have not made any tests in that direction, but I am sure as to Dr. Black's opinion on that point. He says that amalgam does not lose its strength with age, but that alloy does lose its strength with age.

Dr. MAUSTELLER. In one alloy you give five results, and the shrinkage in all was favorable; in two the expansion results were favorable; in one good, and in two bad. How do you account for that difference in the same alloy?

Before you answer that question, I should like to ask in addition, In amalgamating the alloy, how do you apply the mercury? Do you apply it all at once and attempt to incorporate the proper amount of alloy and expel no mercury, or do you expel mercury or add alloy after the amalgamation is started?

Dr. MCCAULEY. The result that you mention in the first case, where three of the five tests showed favorable results, and two others showed unfavorable results, could be produced by errors in the alloying process, viz, either by not heating enough, so as thoroughly to dissolve the metals in each other, or by overheating and producing what is known as eutectica. Any failure to alloy the metals thoroughly, you can understand would leave an uneven distribution of those metals throughout the mass, and a filling made from a certain part of that ingot would be differently constituted from one made from another part of the same ingot. On the other hand, if you produce a eutectic formation by overheating, and that appears in one part of the ingot and not in another, you obtain a result that is not uniform.

As to mixing mercury with the alloy, it is better to start with the correct amount of mercury. The amounts of mercury and alloy should be carefully weighed, and only the amount should be used required to produce desirable plasticity of the mass. This is a point that should always be stressed in the manipulation of amalgam, *i.e.* the proper plasticity of the mass. Unless the amalgam has the proper plasticity it cannot be placed in any part of the cavity desired and kept there.

Dr. W. A. SMITH, Denton, Md. In expressing mercury, would the tin leave the amalgam in greater excess than other metals?

Dr. MCCAULEY. Not if you have a perfect alloy to begin with. If you have a mass that is improperly alloyed or in which the metals have not gone into accurate solution, you may lose more tin in the expression of mercury than other metals, but not so if you have an accurate solution or union between these metals.

I have been impressed with the importance of carrying on this work to a successful end. There is no doubt that the profession is being imposed upon, that we are getting inferior materials without knowing it, and we have no means of telling except by careful research work. We have to take what the manufacturers give us, and, as stated in my paper, ninety-five out of every hundred of the alloys that are offered to save teeth with are unfit. Are we going to sit still and let this state of affairs continue, and grow worse, or shall

we take up the matter and see that we get the right kind of materials?

Dr. LUNDY. Have you any plan to suggest, so that we may make a motion to have it carried out at this time?

Dr. MCCAULEY. I have no definite plan to suggest, further than that this association is the proper body to take this matter in hand; men of ability and integrity should be selected from this association, men who are above a purchasing price, men who have the ability to do the work accurately, and who will make a *bona fide* report of their findings to this association. This work must be done by such a committee, because it is too much for one man. A man cannot conduct a practice and do this work as it should be done. Your Research Committee would perhaps be a good one to which to assign this investigation, if they are willing to undertake it. At least this association should appoint a committee to take this matter up and complete the work as soon as possible. The business heads of the association are better prepared to lay out plans than I am, but this is a work that we must do before we can come to an understanding, and it should be done in such a way that everybody may get justice, and every manufacturer be condemned who should be condemned, because they have no right to supply the profession with such trash as many of the alloys now on the market represent.

Dr. W. E. LUNDY, Memphis, Tenn. I move that this section appoint a committee to meet with the Executive Council, take up this matter, and do what can be done to get the results we desire. And further, that this section request the Council to co-operate with the committee. [Motion carried.]

Dr. PRICE. I will appoint this committee later.

The section was then declared adjourned until a later session.

WEDNESDAY—Afternoon Session.

The second session of Section I was called to order on Wednesday afternoon, September 11th, at 2.30 o'clock, by the chairman, Dr. W. A. Price, Cleveland, Ohio.

Before proceeding with the regular program of the section, Dr. Price introduced to the section Dr. G. H. Watson, Berlin, Germany, secretary of the American Dental Society of Europe.

Dr. WATSON. *Mr. Chairman and Gentlemen,*—This is a little bit sudden. I am very grateful for the compliment and the courtesy which your chairman is conferring upon me in allowing me to bring to you the greetings of the American Dental Society of Europe. We extend to you an invitation to visit our meeting next year in Europe—which will be held at Easter time in Florence, one of the most beautiful cities of Italy and Europe. If we can have the pleasure of having any of you with us, we will be very glad to see you and will treat

you as well as we can—and some of the men over there know how to do that.

The first order of business before the section was the reading of a paper by Dr. L. G. SINGLETON, Pittsburgh, Pa., entitled "The Significance of Normal Occlusion," as follows:

The Significance of Normal Occlusion.

By LAWRENCE G. SINGLETON, D.D.S., Pittsburgh, Pa.

IN the presence of the naturalist an explanation of the value of the normality of a dentition would be equivalent to an effort to demonstrate the potency of a perfectly self-evident and well-known truth. As enlightenment for the dentist, it may appear like "employing a steam engine to crack a nut." But for the sake of humanity, it should prove itself an element of defense against deformity, disease, and the various disharmonies contingent upon perverted growth in the development of the individual.

Since the practitioner of dentistry renders expert testimony regarding all matters pertaining to the teeth, and in view of the fact that his decisions constitute the opinions of the court of last resort, it becomes necessary to occasionally classify the experiences of the past in order to standardize the verdicts of the future.

Owing to the practitioner's laudable success in the inauguration of methods for the attainment of much in the harmony of the human face, as well as his contributory responsibility for some of the disharmonies, it is clearly incumbent upon him to early recognize the fact that a mild indifference toward the importance of the normality of the dentition as regards the units and their relations, involves not less responsibility in the ultimate result than the failure to institute measures for their correction and prevention when such procedures are clearly indicated.

Mortal man, occupying as he does such an enviable position toward the other forms of life upon the earth, is apt to overestimate his importance in the economy of the universe. But with all his experience, and as the result of all his skill, there remains, as the issue of the aggregate of the combined efforts of the whole of mankind, nothing that is permanent, nothing that is fixed, which can resist the ravages of time and stand out as a permanent monument to his superior intelligence and skill in the operations of his functions.

There is abundant evidence to prove that for eons of time before man assumed the ascendancy on this planetary rib of the sun, those identical forces which shall have control of its ultimate destiny in the annals of time were in as complete operation, and were possessed of the same absolute certainty of effect, as has ever obtained during the period of his most phenomenal records of advance.

It is assuredly unnecessary to prove the precincts of our origin in order to enjoy the emoluments of our existence. But it is incumbent upon us to recognize the conditions of our existence, and place ourselves in conformity with those forces which govern the same, in order to derive the most benefit from their operation.

In this attitude we may direct our inquiries toward the significance of certain considerations involved in the study of

teeth in their relation to the face, for the sake of a clearer interpretation of those problems which confront us in our daily pursuits. But it is frequently necessary to check our mad course among the lofty heights of the spectacular and drop to the level of mediocrity, by faithfully considering basic principles, in order to arrive at a substantial estimate of our progress.

Owing to their intimate relation to the necessities of nutrition and their formidable position in the matter of defense, the teeth have been inseparably associated with the history of animal life upon the earth for untold millions of years. In the matter of their significance in the functions of prehension and nutrition they have, even in the higher mammals, unmistakably antedated the uses of the hand. But with the advance of civilization, through discovery and invention, manual dexterity and skill has largely superseded the function of these pioneer organs of nutrition and defense, sacrificed, it may be, at the expense of some of their most valuable properties, as is evidenced by the ravages of disease with which we are so intimately concerned.

In the matter of evolution the forces of nature have been extremely prolific in the variety of designs effective in the purpose for which they have been evolved, and having traversed a wide range of possibilities in the adaptation of the mammalian forms for the uses of man, the human dentition represents a convenient apparatus for a generalized diet.

The problems of teeth have been most indelibly stamped upon the records of the past, and these organs, by virtue of the nature of their composition, have persisted as one of the most substantial evidences of pre-existing species. It is a significant fact that much of the mystery of the past has been satisfactorily unraveled by the careful interpretation of the characteristics of teeth.

Since nature has been creating designs and arranging teeth for a period of time sufficiently long to entitle her to respect, even before man entered the arena of combat, her precedents in regard to occlusion should receive the careful consideration that their importance demands. And it is a thought worthy of our most serious consideration, that as long as man has existed as a separate species in the zoölogical kingdom—which comprises a period of untold thousands of years—his typical dentition has been retained as a most persistent and dominant characteristic. Since this design has been in continuous service for a sufficient length of time to prove its utility and efficiency, it is manifestly an undertaking which borders upon presumption to set up artificial standards of occlusion as a substitute for the accredited plan of creation.

Neither are we justified in assuming that the human dentition is in a transitional stage because of occasional aberrant forms, discrepancies in number, and departures from the normal in position. There are undoubtedly conditions of "variation" from obscure causes, constantly arising, which according to the evidence of the past may be potent for the institution of new forms to come. That, however, will be a problem for the paleontologist of the future rather than a consideration for the anatomist of the present. But judging from her previous hesitating disposition toward the inauguration of new or spectacular forms, and before these processes of variation have culminated in the new and more perfect man, mother earth herself may have been separated into her elements, and then,

having been shifted into the oblivion of time and space, may go drifting nonchalantly down some starry pathway, preparatory to beginning anew the cycle of her primordial existence.

According to a theory of heredity promulgated by Weisman, the germ plasm constitutes the physical basis of heredity, and only those characteristics which have been impressed upon this medium possess the potentialities for realization in the inheritance. The normal dentition, therefore, may be considered an expression of our ancestral inheritance. Aside from the "continuity of the germ plasm," there are other influences, immediately operative, which may deflect the course of development and retard or finally prevent the full expression of the inheritance in the individual. Irregularities of nutrition in the embryonic state, the effects of disease, and the absorption of drugs create conditions of environment which militate against the expression of the potential design, but these cannot in any sense be considered a part of the germinal inheritance.

We may therefore credit the malocclusion of teeth—including impactions as well—which are, in form and position, at variance with the type of the species, to the absence of appropriate environmental conditions and developmental stimuli. The function, therefore, of the orthodontist, and likewise the aim of the idealist, is not merely tooth alignment or the construction of ingenious appliances, not the reversal or obstruction of nature's processes, nor the creation or mutilation of types, but the endeavor to realize the purest expression of the inheritance in the individual.

The only scientific basis for the attainment of this goal consists in the application of the principles of normal occlusion as advocated by Dr. Angle; not as a dogmatic theory arbitrarily adopted, but as a natural standard most beautifully and continuously illustrated all through the records of the past, and enjoying the distinction of having been universally incorporated as a part of the architectural design in the creation of species.

The significance of normal occlusion loses a most potent motive in the absence of a genuine conception of the "line of occlusion," which has been defined as "the line with which, in form and position according to type, the teeth must be in harmony if in normal occlusion." Furthermore—"it is more than the tangible or material. It may be regarded as the basic ideal of the dental apparatus, the comprehension and appreciation of which will grow in proportion as our knowledge of the science of occlusion unfolds." (Angle.)

Without this basic principle, normal occlusion would represent nothing more than the mere contact of surfaces and the close approximation of the units in alignment, regardless of their number and denomination. In conformity with such a conception, the individual units lose their significance in the economy of the organism, and rank as accidental appurtenances, to be eradicated at will or left to destruction by default.

This virtually constitutes the parting of the ways, the slough of despond, where many an unwary traveler has struggled, and in the darkness has dismally met his Waterloo.

Each organism contains the potentialities for the completion of its cycle of existence in a perfectly characteristic and well-ordered fashion. The conditions of its environment form an absolutely essential complement for the innate peculi-

arities of its inheritance. Should the characteristic order of its development meet with unusual or disproportionate resistance, the perversion of its purpose constitutes the confused witness of its conflict.

In the event of such a contingency, and providing there exists sufficient inherent developmental vigor to induce the requisite activity, the rehabilitated forces proceed anew, from the point of interruption, to follow the remaining stages of the cycle to its ultimate termination.

In a technical sense, and in conformity with its ideal conception, orthodontia, based as it is upon the science of normal occlusion, affords no sanction for the mutilation of the dental apparatus. Extraction, therefore, has not been featured in the true science of orthodontia.

The most elementary conception of orthodontia demands the establishment of the "line of occlusion." The realization of this idea demands the full complement of teeth, characteristic in their form, position, and relations; and in this connection it may be stated that the standard of procedure for the dentist is not less rigid than for the orthodontist, inasmuch as the final verdict admits of no middle ground.

In this august presence a formal definition of normal occlusion would be superfluous, but an analysis of its significance would be manifestly incomplete in the absence of an explicit statement concerning its major premise in the form of its original interpretation. The value of much that has been written regarding the relations of the teeth might readily be determined by the measure of its conformity to this ideal conception of the line of occlusion.

> There can be but one line of occlusion, and it must be the same as the architectural line on which the dental apparatus was constructed. This ideal line was intended to govern not only the length, breadth, and peculiar curve of the dental arches, but the size and pattern of each tooth, cusp, and inclined plane composing these arches. And more than this: That as the dental apparatus is only a part of the great structure—the human body—each part and organ of which was fashioned according to lines of design, it must have been intended that the line of occlusion should be in harmony in form and position with, and in proper relation to, all other parts of the great structure, according to the inherited type of the individual. (Angle.)

The phraseology—"fashioned after lines of design"—was probably not intended to indicate that natural forces work according to a preconceived plan, but rather that the design is the result of the operation of these forces. But since their operation has been observed to follow characteristic pathways, the result being a typical form, it was probably in this sense classified as architectural design.

In conformity with this interpretation of nature's plan, and as justification for the true science of orthodontia, it may be asserted that the sizes and shapes of teeth themselves, which are a distinct item of the inheritance, together with their growth-force, and these co-ordinating with the physiological stimulation of appropriate environmental conditions, determine the size, form, and position of the dental arches, in conformity with the typal design.

In recognizing the continuity of the cycle of development in regular and characteristic sequence, it becomes equally incumbent to concede its susceptibility to interruption, as well as to affirm the direction of its course. Its interruption constitutes a perversion proportionate to the force; its direction is

forward, to the culmination of its purpose.

The inexcusable disregard of this natural condition leads to numerous embarrassing conclusions relative to the province of orthodontia. The contention that the results of the application of the principles of normal occlusion in orthodontic procedure do not justify the claims of its advocates is an evidence of a misconception of the very spirit of orthodontia. In view of the fact that orthodontia implies "the science which aims to assist nature in building the line of occlusion" (Angle), its advocates are not in accord with the idea that the dentition may be permitted to pursue a precarious course of development until the teeth have reached an uncertain position of latitude and longitude, and then, by the institution of some form of mechanical violence, pretend to eradicate all the evidences of perverted growth, and obtain a result comparable with the perfect correlation of parts in unrestricted development.

The forms of teeth, including their roots, are a continuation of characteristics which are a part of the heritage of the species, and are generated in conformity with the laws of heredity. And the weight of the evidence obtaining throughout the whole animal kingdom conclusively proves that normal occlusion of the teeth is the inevitable result of the operation of natural force in the presence of appropriate physiological stimulation and nutrition.

The course of development pursues characteristic pathways, but its full realization is susceptible to interruption and perversion. However, either in its perfection or its deviation, it comes fully within the bounds of natural laws.

And herein lies the value of orthodontic procedure. Not that we shall stand idly by, countenancing perverted efforts of growth, hoping to step in later on and invite nature to reverse her course. Her persistent refusal is an evidence of the astounding folly of such a course.

Rather should we fortify ourselves by familiarity with the architectural design, anticipate its requirements, and superintend the construction as indicated, in conformity with natural laws. Then only shall the structure be in full accord with the design; then asymmetry shall give place to symmetry, and harmony and balance shall rule supreme.

The significance of normal occlusion is therefore manifest, representing with all the eloquence of truth the culmination of natural force in the majesty and perfection of its design.

Discussion.

Dr. J. A. Gorman, New Orleans, La. The question of normal occlusion is most vital, not only for the orthodontist and the prosthodontist, but for every practicing dentist. The operator often wonders why his fillings do not remain in position, and if he stops to analyze the reason, he will find that normal occlusion plays a very important part in filling operations.

The essayist states that normal occlusion can obtain only if all the teeth are present. The day has come when the importance of preserving all the teeth and keeping them in normal occlusion is being more and more fully recognized. The extraction of teeth, in my opinion, is very much like a jeweler's statement that a watch which he is to repair has too many wheels in it. Would the manufacturer put too many wheels in a watch? This is an argument which I use every day in my practice, and this very ques-

tion is a good start for educating the public, to say nothing of the dentist.

One of the greatest difficulties that the orthodontist encounters is when the patient has lost some of his teeth and the orthodontist is called upon to place the remaining teeth in their proper positions and retain them there. This maintaining of the spaces where teeth have been lost is one of the most difficult tasks, and it could be profitably discussed by the general practitioner.

Dr. H. C. Ferris, New York. From an orthodontic standpoint, I consider the paper we have just listened to a classic. Those who have made a close study of histology, embryology, and anatomy, will find on careful perusal of Dr. Singleton's paper that he has most ably covered every phase of the subject. He has treated this most scientific subject of the line of occlusion in a delicate and comprehensive manner. This line of occlusion is a mystery that we frequently consider solved when we present a record case of models showing the original condition and the finished product. That finished occlusion, as we see it in the plaster cast, although it may be perfect mechanically, and answer our definition of normal, does not represent the line of occlusion. We have to consider that occlusion in conjunction with the whole animal, with the development of the whole cranium, and it is in that particular that the true orthodontist will develop the ability to treat the individual case that comes before him. No man is able, in the present development of science, to set a plan for us to follow; the method of procedure must be based upon a knowledge and an artistic consideration of the whole anatomical structure.

The subject of heredity, which the essayist touches upon, is also far-reaching in its influence. We are now trying to apply Mendel's law in the interpretation of irregularities and the explanation of deformities, lost structures, etc. It must be considered in this connection that the human being is a much more difficult subject to study than the lower animals. I believe that on a second reading of this paper, you will all be edified.

Dr. R. A. Day, San Francisco, Cal. I wish to compliment Dr. Singleton upon this excellent paper. He has presented the subject so clearly that the orthodontist, as well as the general practitioner, cannot but fully appreciate its importance. We all should understand occlusion, and should devote a great deal of study to it. It is of great importance in every way, not only from the standpoint of the orthodontist, but from that of the general practitioner, as Dr. Gorman has said.

The dentist should recognize the principles set forth by the essayist early enough in life to be able to diagnose conditions and appreciate the necessity for correcting irregularities. This paper will give us much food for thought.

Dr. V. H. Jackson, New York. I have given this subject considerable thought, and wish to congratulate the essayist upon having covered it in such a concise manner. I firmly believe and advocate that every dentist should have very thorough instruction in this subject and know the consequence of the loss of each individual tooth, and practice accordingly. I wish I might be able to discuss this paper at greater length, but I am not at all prepared to do so.

Professor Subirana, Madrid, Spain. No puede haber ningún ortodoncista que no tenga ideas propias sobre la significación de la oclusión que constituye la base de la Ortodoncia? Creemos en

las leyes de evolución orgánica establecidas por Darwin? Creo que no habrá ninguno de los que me escuchan que no comulgue en ellas. Con decir pués que la oclusión humana es el resultado de la sucesiva adaptación del sistema dentario animal á las necesidades por ese sentidas á través de las edades desde que apareció el primer diente en los peces, queda hecha su apología; y así como más descendemos en la escala zoológica vemos más uniforme y simplificado el sistema dentario, más vario y especializado lo encontramos á medida que ascendemos en la escala animal, hasta llegar al hombre, cuyo sistema es la cúspide de lo perfecto precisamente por ser el resultado de la adaptación, y así vemos cómo él tiene muelas, bicúspides, caninos, etc., variedad dentaria que responde á su cualidad de omnívoro. Quien mutile en una ó dos piezas esa oclusión, desde aquel momento deja de ser ortodoncista para convertirse en cirujano como dijo el Sr. Singleton, porque precisamente esa es la misión ortodóncica, la de restituir la normal oclusión alterada. Es qué solo tiene importancia esa oclusión bajo el punto de vista de la digestión? No; todos sabemos lo que representa en el orden biológico la *excitación funcional*, y ahí está precisamente su importancia, en el estímulo mecánico que representa, ejercida normalmente millones de veces, en la sangre, en la linfa, en los músculos, en los huesos é indudablemente en el cerebro. No solamente no hay diente que no cumpla su función excitadora, sino que no hay cúspide, ni plano inclinado que no ejercite su modesto papel, y quien al corregir un diente no lo considere así, merma la eficiencia de la oclusión.

Yo llego más allá; he dicho ya y repetiré aquí que por no ejercitarse la función masticatoria y por mutilarse la fórmula dentaria normal, y en consecuencia la oclusión, desde millones de generaciones, los niños que sufren de erupción dentaria dolorosa y difícil, es debido á que la herencia ha ido transmitiendo cambios de fórmula por falta de excitación funcional y los folículos dentarios han perdido su potencialidad de erupción.

La carencia del conocimiento de vuestro idioma me impide continuar, pido mil perdones al auditorio.

[Translation.]

Prof. SUBIRANA, Madrid, Spain. Can there be an orthodontist who has no ideas of his own as to the meaning of occlusion, which constitutes the basic principle of orthodontia? Do we believe in the laws of organic evolution established by Darwin? I do not think there is a man in this audience who is not influenced by them. By saying, therefore, that human occlusion is the result of the successive adaptation of the animal dental system to the needs developing through the ages since the appearance of the first tooth in the fish, its apology is made; and in the same way, the farther we descend in the zoölogical scale the more uniform and simplified a dental system we find. This system is the more varied and specialized as we ascend the animal scale until we reach man, whose system is the most perfect on account of its being the result of adaptation, and thus we see how he has molars, bicuspids, canines, etc., a dental variety necessary for its purpose of serving an omnivorous animal. He who mutilates that occlusion in one or two instances ceases to be an orthodontist and becomes a surgeon, as Dr. Singleton has said, because the orthodontist's mission is that of restoring the altered conditions of normal occlusion. Is this occlusion important only from

the viewpoint of digestion? No; we all know what part the *functional stimulation* plays in the biological order, and on this depends exactly its importance, viz, in the mechanical stimulus that it represents, normally exercised millions of times in the blood, in the lymph, in the muscles, in the bones, and undoubtedly in the brains. Not only is there not one tooth which does not fulfil its exciting or stimulating function, but there is not a pyramid or an inclined plane which does not play its modest part, and the practitioner who, in correcting or restoring a tooth, disregards these rules entirely, will minimize the efficiency of occlusion.

I go further than that. I have already said that owing to the lack of exercise of the masticatory function and to the mutilation of the normal denture, and, with it, the mutilation of normal occlusion, which has been going on for millions of generations, the modern child suffers from painful and difficult eruption of its teeth, owing to the influence of heredity, by which changes in the denture have been transmitted owing to lack of functional stimulation, and the dental follicles have lost their potentiality of eruption.

I should like to proceed, but must now close, as I am not sufficiently familiar with your language to address you in it.

Dr. E. A. Bogue, New York. It is certainly with pleasure that, after two or three minutes' perusal of Dr. Singleton's paper, I take up the subject where he left off, and with your permission, go backward a little in its early history. Orthodontia, as I understand it, does not mean mutilation in any sense. Not long ago I received a letter from a friend in Europe who is an orthodontist and who made use of the following notable sentence: "Isn't it grand that, instead of repairing a few broken-down teeth, we undertake to repair or put in order the masticating apparatus of man and make it complete." The thought of mutilation had never entered his head, and I feel thankful to him for his mode of expression.

The title of this paper is, "The Significance of Normal Occlusion." Mr. Chairman, may I be permitted to modify it so as to read: "The Significance of Abnormal Occlusion"?

There are two sharp critics here, Dr. Ferris and Dr. Jackson, and when they find me wrong I hope they will correct my mistakes. Abnormal occlusion means, I think, almost always a diminution of the lumen of the air-passages. When, how, and why does that diminution take place? It often takes place before the first year of the child's life is completed. How does it take place? It very often—although I cannot give any statistics—is due to the presence of adenoids. At once we are confronted with the questions, What are adenoids, where do they come from, and why are they present? It is singular that adenoids should have existed always as far as we know. Canova made a statue of himself and represented himself as a mouth-breather with a stupid look, which, we know, did not belong to a man of his mental ability; yet in the lasting marble he has put himself down as a sufferer from adenoids.

There is the so-called tonsillar ring. We have heard it said many times that every baby is born with adenoids. This statement, I think, is a misuse of terms. Every baby is born with five little nodules, two of which become tonsils, while the other three are waiting perhaps for mischief. Most mothers, when their

children catch cold, do not think much of it; they do not realize that by a single attack of cold the baby may be laying the foundation for shortening its days. The baby catches cold, and the irritation and inflammation perhaps extend into the nasal passages, down the naso-pharynx and beyond, to those nodules of the tonsillar ring, and these enlarge and become inflamed and form what we call adenoids, situated between the other two nodules and behind the pendulous portion of the soft palate. The child subsequently breathes through the mouth instead of the nose, because of this obstruction. Many mothers do not realize the seriousness of this condition. The adenoids become a mechanical obstruction to the child's breathing. When the child opens the mouth in order to breathe the muscles of the mouth are drawn against the row of teeth which are inside of the gum and not yet developed; the tongue is distracted from the roof of the mouth and no longer pushes upward and outward, and anterior protrusion ensues owing to lack of lateral growth. If no attention is paid to that condition, the air-passages will not be wide enough to allow a free flow of air to fill the lungs, and the lungs do not fully develop. If the lungs are not developed, the thorax cannot be developed, and instead of growing up straight, the child becomes round-shouldered, the spinal column becomes distorted, generally anteriorly. Very often a lateral curvature of the spinal column occurs, a weakness of the heart follows the diminution of lung capacity, a diminution of the thorax cavity ensues, and the child is manifestly an invalid. Many times when expressing before my professional brethren my views that I have yet to see a single case of saddle-shaped arch which was not accompanied by curvature of the spinal column, I have noted their utter surprise.

We are just beginning to realize that it is the dentist's duty to warn the mother that her child, though it be beautiful and perfect apparently, may belong to that seventy-one per cent. of defectives mentioned today by Dr. Ebersole, as found by the New York State Board of Health. If we are able to discover these defects and remedy them at an early age, we shall be of greatest service to the child. I am treating children from three and a half to five years of age, and I hope that the rest of my practice will be made up of that class of patients. Then I shall be able to say to many parents, as I said to a professor in a medical college yesterday: "I am glad that your baby has every prospect of having its life prolonged for years by what has been done. He breathes better, catches no more colds, and the prospects are that he will be a healthy child instead of a sick one."

Dr. M. C. Smith, Lynn, Mass. I would like to say a few words on this vital question, also to call Dr. Bogue's attention to one error he has made when he spoke of the three nodules looking for mischief. They are not there looking for mischief, but for a physiological purpose, and in order to assist the economy of the body in supplying a deficiency. We are not getting at our patients early enough. We are only doing repair work, and the orthodontist does the most repair work of any. We must get at our patients earlier and not have so much repair work. The vital principle is to avoid delay of treatment. We may not know today just what all these enlargements of the glands of the throat mean, but there are a few facts which we know about them, and we should work on the basis of those.

We know, for instance, that, if we treat a cretin child with thyroid extract, the growth of the teeth is remarkably stimulated. We know also that the pituitary body has some influence in the fixation of lime salts in the body, and that the parathyroid glands have something to do with the lime salts in the blood-current. Let us, then, study these ductless glands and learn which one is controlling that part of the economy of the human body called the mouth. If the pituitary gland in a young person is diseased, giantism will result. Disease or enlargement of the pituitary body in adults causes a malady which is very rare in America but common in other countries—acromegaly, enlarged growth of the long bones, and especially of the lower jaw. A careful study of these glands should reveal which one is to blame for deformities in the mouth.

These nodules which Dr. Bogue spoke about have a physiological function to perform. They are not diseased glands, but by sympathetic enlargement they help supply what is lacking in the thyroid gland as the fixation agent of lime salts in the body. We have to go farther back, to the very first months of fetal life. If a pregnant mother seeks relief from nausea and morning sickness, she is given thyroid extract. If the nursing mother fails in the milk supply, she is given thyroid extract to stimulate the milk supply. Nursing is the physiological action of the child necessary for the development of the pharynx, the lungs, the spinal column, and the maxillary bones, and is one of the vital principles underlying orthodontia. The child must nurse in the way that nature intended it to, and if it does not receive its supply of milk from the mother, it cannot develop properly.

We must get down to the vital underlying principle and find out what is the reason for the sympathetic enlargement of the glands to supply the thyroid extract deficiency in the fixation of the lime salts in the body. The parathyroids are generally acknowledged as controlling the lime salts in the blood-stream, and the thyroid the fixation of the lime salts in the body. The pituitary body may have something to do therewith, but we must investigate and study, in order to ascertain which one of the ductless glands is at fault.

Dr. Singleton (closing the discussion). I will not take any more of your time in closing the discussion. My views have probably been expressed as carefully in the paper as I can express them. I wish, however, to thank those gentlemen who have assisted me in the effort to interpret the significance of normal occlusion. I think we are all beginning to realize that this significance is a very great one.

The next order of business was the reading of a paper by Dr. L. S. Medalia, Boston, Mass., entitled "Chronic Alveolar Osteomyelitis (Pyorrhea Alveolaris)—Its Causes, and Treatment with Vaccines: With a Bacteriological Study and Report of 115 Cases."

Dr. Medalia's paper here follows:

Chronic Alveolar Osteomyelitis (Pyorrhea Alveolaris)—Its Causes, and Treatment with Vaccines:

With a Bacteriological Study and Report of 115 Cases.

By LEON S. MEDALIA, M.D., Boston, Mass.,
LATE INSTRUCTOR IN PATHOLOGY AND BACTERIOLOGY, TUFTS COLLEGE MEDICAL AND DENTAL SCHOOLS, PATHOLOGIST AND VISITING PHYSICIAN FOR VACCINE THERAPY, MT. SINAI HOSPITAL, BOSTON, MASS.

Introduction.

During my investigations of the opsonic index and the use of vaccines in the treatment of diseases due to bacterial infections, I was approached (in 1907) to find out if anything could be done with this new method of treatment for "pyorrhea." I have since had under my personal observation 115 cases, besides several other cases where I have acted as consultant. The cases here reported are all private patients, most of them sent to me by their respective dentists or physicians, while others applied for treatment of other diseases or for relief of other symptoms.

The laboratory work in connection with this study was carried out in the beginning at the pathological laboratory of Tufts medical and dental schools, and has continued, since 1910, in my private laboratory.

This work was carried out with the following objects in view:

(1) To help clear up, if possible, the etiology of this disease by means of the opsonic index, bacterial cultivations, and specific therapy.

(2) To establish the value of the vaccine method of treatment in this disease.

(3) To establish the relation of cause and effect of the bacteria isolated from the pus, by means of animal inoculation.

Etiology.

The understanding of the etiology of this disease depends upon a thorough knowledge of the true anatomical relation that the tissues surrounding the tooth bear to its socket, and what the alveolar process is.

Almost all authorities and text-books on dental pathology refer to the tissue between the root of the tooth and the alveolar bone as the periosteum, or periodontal or peridental *membrane*. According to Malassez(1), on the other hand—

> The so-called "alveolar-dental periosteum" or "peridental membrane" is nothing more than an alveolo-dental ligament, because of the fact that if one examines microscopically longitudinal or transverse sections comprising the tooth and the neighboring parts of the maxilla one does not find in the alveolar dental space anything that resembles a periosteum nor any other *enveloping membrane*. What one does find there are solid bundles of fibers which emanate from the wall of the alveolar cavity, go convergently to insert themselves into the surface of the dental root, thus forming a sort of circular ligament. They penetrate deeply in the form of fibers of Sharpey into the bone of the maxilla as well as into the cementum, similar to what

takes place in the solid tendinous insertions (in other parts of the body). Some of the bundles, the most superficial ones, those which spring from the alveolar margin, generally speaking have their maxillary attachment higher or more superficial than the dental-root attachment, in such a way that the tooth finds itself suspended by these bundles on the inside of the alveolar cavity. Mastication, therefore, cannot produce painful compression—as it would if it were a "periosteum"—but simple traction, as is true of all ligaments. What is more, there exists between these tendinous bundles large spaces filled with a loose cellular tissue or medullary tissue communicating with other neighboring medullary spaces, and it is in these spaces that are found the voluminous blood-vessels and the numerous nerves of that region.

From a study of comparative anatomy(2), he says we learn that—"In many animals the teeth are not inclosed in alveolar sockets. They are simply found contained in the gingival mucosa, but they are also fastened to the maxilla by solid ligamentous bundles, which are analogous to our so-called 'alveolo-dental periosteum.'" Malassez quotes Ranvier and other observers as siding with him, and all his statements are backed up by drawings from microscopic specimens that are sufficiently clear for anyone to draw his own conclusions from.

Personally, I cannot help but side with Malassez and the other authorities whom he cites.

The alveolar process is not therefore a bone distinct from the maxilla, but is *part* of the maxilla. The socket is nothing more than an enlarged medullary space of the maxilla, and instead of being lined by a supposedly thin plate of compact bony substances as Talbot(3) would have us believe, it is simply made up of the thinned-out edges of the maxillary bones and their trabeculæ or bony offshoots, as seen on microscopic specimens. Also, instead of an elastic "peridental membrane," which is supposed to act as a cushion for the teeth, we really have an alveolo-dental ligament—a circular ligament—which keeps the tooth suspended in the alveolar cavity.

From the above short sketch of the anatomy of these parts it is very easy to understand the morbid changes that take place in this disease. According to Znamensky(4), whose microscopic studies of the pathological specimens are considered the best, the disease begins with an inflammatory process of the gum margin at the gingival space; it destroys the epithelial tissue and gradually involves the bones, which latter become necrotic. New bone formation (osteoid tissue) takes place and results in a partial involucrum (a partial encapsulation). It is the involvement of the bony socket which is considered by almost all the observers to be the characteristic feature of the disease.

Now, since the chief characteristic feature is the involvement of the alveolar bone and the tooth socket, the latter being nothing more than an enlarged medullary space of the maxillary bones, the only term it seems to me that we can properly apply to such a disease is CHRONIC ALVEOLAR OSTEOMYELITIS. This term, as you can see, is truly descriptive of the disease; it immediately suggests to one its morbid anatomy, its causes and the modes of its progressiveness, and, above all, its proper treatment, while the other terms—Riggs' disease, pyorrhea, or periodontal disease—do not describe the affection and are therefore misleading.

Having made the normal and morbid anatomy of these parts clear, the etiological factors of chronic alveolar osteomyelitis become apparent. They are local and general.

The local causes are (1) mechanical and (2) infectious.

The mechanical are by far the more important ones in starting the disease, but less so in keeping it up. It is the local infectious causes, on the other hand, that are the more important in keeping up the disease.

The local mechanical causes are the same that are responsible for ordinary gingivitis, and the most frequent of them are calculi or tartar deposits. Tartar as a cause of alveolar osteomyelitis was recognized by Ambroise Paré([5]) (1550) and other early writers centuries ago. It has been recently emphasized by Fletcher([6]), at the last meeting of the American Medical Association. In a previous communication([7]) I called attention to the necessity for an albuminous or organic nucleus for the formation of calculi. The organic nucleus may be some food remains on the gingival space together with some epithelial cells and bacteria. The organic matter, if allowed to remain any length of time, will ferment. The products of the fermentation will cause the precipitation of salts from the saliva or other secretion and form a calculus in the same way as calculi form in other parts of the body.*

The local infectious causes comprise the bacteria, principally those capable of pus production. The important ones are the pneumococcus in chain or diplo forms, staphylococcus aureus, streptococcus, and M. catarrhalis. These organisms are recognized today as the infectious agents, affecting the tissues either spontaneously—due to disuse and the consequent improper blood supply—or following a mechanical injury. They are always responsible for keeping up the disease. (A careful review of this phase of the subject as found in the literature as well as my own findings will be described later.)

The careless use of infected instruments as a possible cause of alveolar osteomyelitis should be emphasized here. The same instrument used in scaling or cleaning an affected tooth, if used without being re-sterilized in treating other unaffected teeth in the same patient at the same sitting, might spread the disease to the healthy teeth.*

The general or systemic causes are more in the nature of predisposing causes—lowered resistance—as a rule, rather than exciting causes. It is conceivable that acute infectious diseases—pneumonia or typhoid fever—will render the general resistance of the patient to various organisms so low that a beginning of an alveolar osteomyelitis would follow, especially so if the cleanliness of the mouth be neglected, and if there be present some local irritant, rough edges of cavities, calculi, or artificial bridge work. As a general rule, however, the systemic disturbances met with during this disease, in my opinion, follow the local trouble, and in turn are responsible for keeping it up. The systemic importance of this disease, or rather its consequences, I will take up later.

* In the gall-bladder typhoid bacilli act as an organic nucleus. Living typhoid bacilli have been found in the center of gall-stones, and experimentally it was found that if typhoid bacilli were injected into the gall-bladder of healthy rabbits they would produce gall-stones. The necessity for an organic nucleus in the production of calculi is thus established.

* One of the best methods for sterilizing instruments during the progress of an operation is to dip them in a jar of alcohol and then burn off the alcohol. This can readily be done by bringing the alcohol-saturated instruments in contact with the flame of an alcohol lamp.

Brief Review of the Literature.

I shall limit myself to the discussion of that part of the literature which deals only with the relation of bacteria to this disease. The important bacteriological investigators on this subject are Galippe(8), who isolated two organisms from pyorrheal pus, one of which he described as a double bubble. He succeeded in causing suppuration by inoculating this organism under the skin and in the joints of guinea-pigs and rabbits. His attempts to produce pyorrhea by inoculations in the gums of rabbits were not conclusive.

W. D. Miller(9) isolated twenty different organisms from twelve cases of human pyorrhea. Among them he found staphylococcus aureus twice, staphylococcus albus once, and streptococcus once. The other sixteen were not identified by him. He therefore concludes that "Pyorrhea is not caused by a specific bacterium which occurs in every case, but various bacteria may participate in it." His attempts to produce pyorrhea in healthy dogs artificially were unsuccessful. He did succeed, however, in producing inflammation, and in one case a little suppuration, but inside of a week the lesions were completely healed. He recommends experiments to be carried out on old, emaciated, or sick dogs.

Personally I have tried the artificial production of alveolar osteomyelitis in two dogs. The cultures used for the inoculations were those isolated from two patients. One was a streptococcus and the other a pneumococcus in chains. The only result I obtained from the gum inoculations was an acute inflammation which subsided within a week. I repeated the inoculation three times, with similar results each time, *i.e.* the gums were healed up at the end of one week.

I believe the negative results to be due (1) to the natural resistance of the dogs, both of them being in a very healthy condition, and (2) to the lack of sufficient injury done to the alveolar process at the time of inoculation—sufficient to produce an osteomyelitis. I must confess that I was not aware at the time I made the experiments that pyorrhea so called is in reality a chronic alveolar osteomyelitis. The negative results of the other investigators cited are probably due to the same reasons. In my future experiments I shall know better.

Kirk's(10) finding of a pure culture of diplococcus pneumoniæ in a few cases of freshly opened pericemental abscesses is of importance because of the minimal chances of contamination under such circumstances. Black(1), Von Arkövy(12), and others found bacteria in pyorrheal pus, but they failed to identify or properly describe them.

Simms(13) records the following bacteria in 10 cases of pyorrhea which he identified: Staphylococcus aureus 2, staphylococcus albus 1, streptococcus pyogenes longus 1, M. catarrhalis(?) 10; streptococcus brevis, spirilla, and fusiform bacilli occurred in every case.

All the investigators thus far cited approached the bacteriological study of the diseases merely from the standpoint of establishing the etiological relation of bacteria to pyorrhea. Goadby(14) (1905) was the first to study the relation of bacteria to pyorrhea both from the standpoint of etiology and that of treatment, making use of Wright's bacterial vaccines in this disease. According to Goadby(15) the streptococcus pyogenes, M. catarrhalis, and staphylococcus aureus and albus are the most frequent organisms met with in this disease. Apparently he left

out of consideration the possibility of pneumococcus occurring in chain forms, and considered all the organisms occurring in chains as streptococci.

The confusing of the streptococcus with the pneumococcus in chains is met with in the literature and in a great number of text-books, to which I have already called attention in a previous communication([7]). It has also been called attention to by Ricketts([16]) and others.

In a recent article Goadby([17]) reports 70 cases of early pyorrhea treated by vaccines; 45 of these he reports as cured, 13 relieved, 11 disappeared, and 1 died from an intercurrent disease. He therefore concludes that "The prognosis of early cases is 60 per cent. of cures, while without the vaccine treatment the majority will progress not only to the loss of the teeth, but to diseases of divers natures which have been shown to be associated with pyorrhea."

Jones and Humphreys([18]) reported 5 cases treated by autogenous vaccines with good results. The organisms found by them in all of the cases they described as streptococcus, occurring often as a diplococcus in short chains or chains of diplococci. The organisms described by these authors correspond exactly to the one I found in most of my cases, but which I designated as pneumococcus in chains.

Eyre and Payne([19]) (1909) reported the bacteriological findings in 33 cases of pyorrhea as follows: Staphylococcus aureus 2 cases, M. catarrhalis 9 cases, M. catarrhalis and streptococcus pyogenes longus 11, streptococcus pyogenes longus 7, streptococcus lanceolatus pneumoniæ 4. They treated with vaccine 26 of the above 33 cases, with the following results: 21 cured and remained cured from nine to fifteen months, 4 improved, and 1 died. All these were advanced cases of the worst type. They were all followed up with vaccine treatment as well as local and general treatment.

Beebe([20]) reported 17 cases of pyorrhea treated with good results by vaccines: 6 of them showed a pure growth of pneumococcus both in chains and diplo forms, while the other 11 showed the same pneumococcus mixed with staphylococcus aureus.

The foregoing brief review of the literature indicates that observers in all parts of the world who have had any experience at all in the treatment of this disease by means of vaccine are unanimous as to the good results obtained with this method of treatment. It is to be remembered that the observers, be they bacteriologists or medical men, have always handled their cases together with the dental surgeons, and their reports are the conclusions reached by both the medical man and the dentist.

Personal Work.

The study of the 115 cases of "chronic alveolar osteomyelitis" or pyorrhea alveolaris, which makes up the subject-matter of this communication will best be described under three groups, divided according to their clinical appearance and chronicity into—I: *Incipient.* II: *Moderately Advanced.* III: *Far Advanced.* Before taking these groups up under their separate headings, it will be best to describe the method of procedure in handling the patients as a whole, the method of obtaining the cultures, and also in a general way the findings, treatment, and results.

METHOD OF PROCEDURE.

Each patient was given a thorough physical examination when he first applied for treatment, also a careful urine analysis and examination of feces, both chemical and bacteriological. Specimens of blood were obtained for the opsonic index. The blood was also tested by Talquist Hem. scale and smears of blood stained and examined microscopically. No further examination of the blood was made when the above were found negative. Cultures from the gums, nose, and throat were obtained, both for bacteriological examination and the preparation of vaccines.

Technique. Cultures from the gums were obtained in the following manner: The lips or buccal parts were kept away from the affected tooth by means of a sterile tongue-depressor by the patient or an assistant. The gums around the affected tooth were carefully wiped off with sterile cotton. The pus was then squeezed out by means of a sterile swab. This pus in turn was collected with a fresh swab and labeled No. 1. Further pressure would cause a second and third drop to ooze out, which were collected on a second and third swab respectively. The first drop of pus was smeared upon cover-slips for the direct microscopic examination, while the second and third drops of pus were used for cultural purposes. In cases where there was no visible pus present (incipient and some moderately advanced cases), the gums that showed the most sponginess, inflammation, or recession were used. A sterile, heavy platinum wire was used to obtain material for cultural purposes, alongside of the swabs, from the gingival space or from a pocket if any were present. Several culture tubes were inoculated at the same time and results compared. In a word, all efforts were made in each individual case to obtain cultures from the pus or affected places, as free from contaminating material or contaminating organisms as is possible under the strictest bacteriological methods.

Culture media used were glucose agar made of fresh meat, beef blood serum, plain and glucose bouillon, and Schottmüller's blood agar (prepared by mixing 2 cc. of fresh human blood obtained from a vein and 5 cc. plain agar). This latter medium was used for plating purposes in order to establish the hemolytic property of a streptococcus when found. The glucose agar was found to be the best medium for the growing of the bacteria for the preparation of autogenous vaccines.

BACTERIOLOGICAL FINDINGS.

(a) *Direct microscopic examination of smears.* The smears of pus were stained by my methylene-blue stain([21]), also by Gram's method, and at times Wright's modification of Leishman's blood stain. As the microscopic findings of the smears were practically the same in all cases, one description of the bacteria found will be given here which will be applicable to all.

The direct smears of pus when stained and examined microscopically showed, aside from a great many pus cells, a variety of bacteria, both bacilli and cocci, as well as spirochetes of all sizes and shapes. A few red blood corpuscles were also found, especially if bleeding occurred in collecting the pus.

The bacilli were very numerous, but rarely those identified as pathogens. They also rarely grew upon the artificial culture media known. A great many of the cocci, on the other hand, were those found associated with pus or disease pro-

duction in other parts of the body, and grew readily on artificial culture media. Aside from a number of micrococci, varying in size and arrangement, which could not be identified, there were almost always present large masses of groups of staphylococci, diplococci resembling pneumococci, tetrads, a rare chain of diplococci, and at times a few short chains of streptococci. Masses of biscuit-shaped diplococci resembling M. catarrhalis were also met with at times.

Gram's stain helped to identify the various organisms; the bacilli only rarely stained by Gram, and a great many of the cocci were also found Gram negative, while the chains of diplococci (pneumococci) and the streptococci were almost always found Gram positive.

(b) *Cultural findings.* During the early part of the work it was at once apparent, both from the opsonic index and cultural findings as well as from results obtained by the administration of autogenous vaccine, that the bacteria to reckon with in this disease belong to the coccal group rather than the bacillary types. Among the cocci found, those that are known to be responsible for the production of pus in other parts of the body are the ones, and the only ones, that are of any importance in this infection. Specifically, they are pneumococci in chains or diplo forms, staphylococci, streptococci, and M. catarrhalis—either alone or in combinations. The most frequent of these, and the one that appeared in practically all the cultures—107 times out of 112—was the pneumococcus in chains, or the so-called "streptococcus lanceolatus pneumoniæ." The others were less frequent, and occurred rather in combination with this organism than alone. Thus in the whole series of cases I found—

	Times.
Pneumo. (strepto. lanceolatus pneumoniæ)	26
Pneumo. and staphylo.	67
" " strepto.	3
" staphylo., and strepto.	10
" and M. catarrhalis	1
Staphylo. " " "	2
" aureus	2
Strepto. and staphylo.	1
Sterile	3

These findings recall to one's mind the findings of Galippe (double bubble) and Kirk's findings of a pure culture of pneumococcus in freshly opened abscesses. Goadby, Humphreys, Jones, and other observers, as I have already pointed out, have apparently confused the streptococcus lanceolatus pneumoniæ, or pneumococcus in chain forms, with the true streptococcus.

Chronic alveolar osteomyelitis is therefore not due to a specific micro-organism present in all cases, in the same way as tuberculosis is always caused by the tubercle bacillus, but is due, according to my own findings and those of other investigators, to a mixed infection of different bacteria, and may vary according to the pathogenic organisms most prevalent in the oral cavity in the particular locality or part of the world.

OPSONIC INDEX AND IDENTIFICATION OF THE RESPONSIBLE MICRO-ORGANISMS.

A. E. Wright's discovery of the opsonic index and his development of bacterial vaccines for purposes of treatment gave us two new methods by means of which we could determine the causal relation of a given bacterium to a given disease.

In the beginning of this work I made it a point to test the opsonic index to as many stock or laboratory pathogenic bacteria as were found expedient, and in

some cases also to the bacteria isolated from the patient's own pus. This, together with clinical results obtained from the use of autogenous vaccines, was the method by means of which the identification of the responsible organism and its relation to the disease was established. A detailed description of the opsonic method of treatment, also the technique as modified by myself, will be found in a previous publication ([22]).

In this series a number of cases were also followed up in the beginning with the opsonic index as a guide to treatment. Later, however, after a great deal of experience with this method of treatment, the clinical reaction of the patient at the point of the injection and the amelioration of the disease were considered sufficient guides to establish the causal relation of the organism found to the alveolar infection, without having to resort to the opsonic index.

FECES EXAMINATION.

The examination of the feces was (1) bacteriological, and (2) chemical.*

Technique. The bacteriological examination of the stool consisted of direct smear examination, stained by methylene blue and by Gram's method. Cultures were made upon glucose agar (stab and surface cultures), beef blood serum, and sterile milk. The milk media were used to detect the presence of the bacillus aerogenus capsulatus. The cultures were made use of for the purpose of determining the presence in the stool of the same organism that was found in the pus of the alveolar sockets, also for the preparation of vaccines to be used in combination with the gum vaccine in those cases that were suffering from intestinal disturbances.

The chemical analysis revealed the presence of excessive amounts of undigested meat remains, starch remains, or excess of fat. Also, by means of the Strassburger fermentation tube it was possible to detect whether the particular intestinal fermentation of which the patient complained was a carbohydrate fermentation or a meat putrefaction. This chemical examination was found of the utmost value in deciding upon the proper diet in the individual case.

TREATMENT.

All the cases were treated by (1) immuno-therapy or vaccine therapy; (2) general systemic treatment, and (3) local treatment by the dentist.

(1) *Immuno- or vaccine therapy.* I call this method of treatment immuno-therapy because it consists of an active immunization of the patient against the bacterium with which he is infected. This treatment is carried out by means of bacterial vaccines, and is also known as the opsonic treatment. The bacteriological and opsonic investigations seemed to indicate that this disease was due to a bacterial infection plus a low resisting power to the particular bacterium. The treatment, then, according to these findings, would be along the lines of raising the resistance of the patient to the infecting agent, which could be accomplished by means of bacterial vaccines and attention to the general condition.

* In order to obtain the specimen the patient was directed to sterilize a wide-mouthed jar ("lightning" or any other preserve jar) by boiling it for half an hour. The boiled empty jar was covered up while still hot and kept covered until used. The movement was passed directly into it. This gave a sterile specimen which could be used for bacteriological as well as chemical purposes.

The technique for obtaining cultures for making the vaccine is the same as that described for the bacteriological examination. The vaccine, which consists of killed bacterial cultures, was prepared and standardized according to Wright's method as described in detail in the communication already referred to([22]).

All the cases had autogenous vaccines made up which were used in combination with the corresponding stock vaccines, *i.e.* vaccines made of the same bacteria obtained from other similar cases. The combination of stock with autogenous vaccine was found to be more efficacious than either alone. (The combined vaccines were used in one injection.) The dose varied from 50 to 100 million of pneumo. vaccine and from 50 to 300 million of staphylo. aureus vaccine, except where the latter was used at the same time for a staphylo. skin infection (acne, furunculosis), when its dose was increased. The dose of the strepto. vaccine varied from 15 to 75 million. The interval varied from five days in the beginning to eight and fourteen days or longer later, according to the local amelioration of the condition. The vaccines were injected in the upper arm, deep-subcutaneously or intra-muscularly. A marked local reaction was met with only rarely; a general reaction was never present.

(2) *Systemic treatment.* Systemic treatment was principally attention to diet, the developing of a water-drinking habit (two quarts daily), proper personal hygiene, and attention to proper elimination. Tonics were found to be needed only rarely. Emphasis was put chiefly upon the diet and personal hygiene, and the results, in my opinion, justified the procedure.

The gastro-intestinal symptoms as a rule yielded to the appropriate diet, while the intestinal flatulence and fermentation responded best by addition to the diet of lactic acid milk prepared at home with the bacillus acidi lactici — Medalia([23]). Any other pure culture of a good lactic acid bacillus may be used.

(3) *Local treatment.* The local treatment was left entirely in the hands of the dentist, who removed calculi and necrotic bone when present, kept the teeth free from tartar, established free drainage of the pockets, and instructed the patient in the home care of the teeth. He found it necessary to delay local treatment in many cases where the teeth were too loose and the gums too tender for instrumentation. Such patients were first followed up by vaccine treatment until the teeth were rendered tighter and the gums less inflamed and less tender. These cases helped to establish the value of the vaccine treatment independent of local treatment.

I wish to say here that local surgical treatment by the dentist is absolutely necessary in conjunction with vaccine treatment for the final successful outcome of the case. It is not to be expected of vaccine treatment to supplant, but rather to supplement, surgical treatment. Similarly we cannot expect local treatment alone to do it all, because, as long as the resistance of the blood of the patient remains low to that particular infecting agent, just so long will the disease persist.

In connection with local treatment it may be of interest to quote from a letter of Dr. H. S. Draper (dentist) of Boston. He says in part:

> A number of years ago it seemed to me that "pyorrhea" was only a symptom of a constitutional disorder, and that local treatment alone would be of no avail, or only palliative. Consequently I have not urged local

treatment unless the patient would also try systemic remedies, which most patients did not seem inclined to do. I attached so little faith to the purely local treatment that I told patients so, and sent them to specialists in local treatment who did have faith in it. The cases usually resulted in a return to me to have artificial substitutes for the teeth, which they finally lost, or in being turned over by the local-treatment specialist to someone who practiced vaccine therapy. The only cases which I feel I have helped by local treatment were cases where the teeth had been neglected and tartar allowed to accumulate—the inflammatory condition disappearing after thorough scaling and treatment. In the worst cases there oftentimes is no deposit present, and in these cases I have no faith in treatment locally only.

The above is the opinion on local treatment alone as expressed by a man for whose observation and conservative judgment I have a great deal of respect.

Besides the local treatment, mild antiseptics were also advised, most of them for purposes of calling attention to the cleaning of the teeth and tartar deposits. A favorite prescription was the following:

℞—Liquor iod. comp. (U.S.P.),
Glycerin, āā ℥ss.
Aquæ destil., ad ℥ij.
Sig.—Apply on gums each morning or at bedtime, with a cotton pellet wound round a toothpick, or with a camel's-hair brush.

This iodin preparation was advised to be applied at the junction of tooth and gum. The patient was told it would not stain the enamel, but would stain any foreign matter or tartar. Hence, as soon as there was much staining the patient knew that he had to go to his dentist to have it removed. This worked well for the purpose of attracting attention to the teeth and gums. Its antiseptic property is of course very mild, especially under the circumstances, where it is washed off by the saliva as soon as applied.

Results.

The results of the treatment have been classified as "cured," "improved," and "no improvement." It might be well to state here what I mean by the term "cured." I considered a case cured when the local condition of the gums became healthy as to color and firmness, when no pus could be squeezed out of the sockets, when loose teeth had tightened up, and when no inflammatory condition was found; also when symptoms such as bad metallic taste in the mouth, soreness and bleeding of gums, and tenderness during mastication disappeared. The recession, of course, that took place before treatment was begun could not be mended by this or any other treatment; further recession, however, was checked. Finally, when any systemic symptoms present, such as rheumatism, gastro-intestinal disturbances, and neuralgic pains, also disappeared or were relieved, and the patient considered himself as feeling "quite well." When these changes for the better in the patient's condition lasted for several months without a recurrence, I thought I had a right to consider such a case as cured.

We will now discuss the cases under their respective groupings:

Group I: *Incipient Stage* (14 *cases*).

Description. The cases grouped under this heading are those where the disease was in its incipience. The gums and teeth taken as a whole appeared in fair condition, but here and there the gum margin of individual teeth showed signs of inflammation. There was congestion

and swelling, distinct discoloration, or slight recession of gum margin. The gums around the affected teeth were found to have lost their elasticity. In some cases the congestion was so marked that bleeding occurred at the slightest touch. Visible pus was rarely present, but smears made from these affected parts showed microscopically the presence of pus corpuscles, also dead epithelial débris and a large number of bacteria.

The teeth in these cases were not found loose, but the necks of the affected teeth were always found uncleanly, surrounded by food débris and tartar deposits. Some of the patients complained of a local discomfort and a dull ache on mastication, while others were not aware that there was anything wrong with their teeth and gums, except perhaps for some bleeding caused by the use of the brush.

Bacteriological findings. The direct smear findings already described are applicable to this as well as to the other groups. The cultural findings of this group are as follows:

Pneumo. and staphylo.	10 cases.
"	2 "
Staphylo. and strepto.	1 case.
Sterile	1 "

The predominating organism culturally was the pneumococcus in chains; the staphylococci were as a rule less abundant.

The *opsonic index* was tested in 3 cases; they were all below normal to pneumo.; 2 were found normal to staphylo., and 2 below normal to colon. One of them was normal to strepto. and colon.

Treatment. The average number of treatments was six—the maximum being eleven and the minimum two, at an interval of from once a week to once in two weeks or less often.

The average duration of treatment was six and one-half weeks, with a maximum of twelve weeks and a minimum of three weeks.

Results. Of 14 cases 13 were cured, while the remaining 1 was greatly benefited. Even in the fourteenth case, where improvement was noted only at the time she discontinued treatment, the gums were still in good condition when she was last seen—about a year later. The progress of the disease was apparently checked.

The permanence of the cure can only be judged from the length of time that the cured cases remained cured. Two remained cured for from twenty-four to twenty-seven months; three from twenty to twenty-three months; five from ten to fifteen months; and three from three to seven months.

Systemic disorders. In this group of 14 cases, 4 suffered from rheumatism and gastro-intestinal disturbances, 1 had rheumatism and asthma, 2 had acne and intestinal fermentation, 1 chronic catarrh and chronic bronchitis, 1 secondary anemia (menorrhagia, low coagulability of the blood), 1 had severe headaches (neuralgias?), 1 had empyema of the antrum and facial eczema, and 3 had gastro-intestinal disorders. Almost all of them complained of a lack of energy and general debility. They were all cured or relieved of the systemic symptoms while under treatment for their local conditions. Nor is this my experience alone; other observers have reported similar results (Eyre and Payne, Goadby, Lewin Payne).

Urinalysis. The urine analysis showed in 9 of the 14 cases an increased amount of indican, probably due to the intestinal fermentation. In none of these cases was there any albumin or sugar. The re-

action was found neutral in 3 cases and acid in 11. The acidity was not markedly abnormal, and the only thing that attracts attention in the urinalysis is the indicanuria.

Feces examination. The bacteriological findings of the feces in this group was colon (B. coli) in 9 cases; B. coli and diplo. (pneumo.) in 3 cases; no record in 2 cases. We might infer that the diplo. (pneumo.) found in the stool were swallowed with the pus from the gums,

TABLE I.—

No.	Initials.	Sex and age.	Date.	Teeth affected.	Treatments.	Duration of treatments.
1	C. O. B.	F. 48	7-22-11	Left lateral incisors.	2	1 month.
2	L. H. B.	M. 30	5-8-11	General recession.	8	2 months.
3	E. C.	F. 35	8-18-10	General recession.	7	2 months.
4	G. L. D.	F. 44	3-27-12	Recession + inflammation.	9	10 weeks.
5	S. W. D.	M. 39	2-10-12	General recession.	4	4 weeks.
6	R. E.	F. 25	5-12-11	Bleeding + general recession.	9	7 weeks.
7	H. H.	F. 35	4-30-10	Bleeding + general recession.	5	5 weeks.
8	C. M. K.	F. 28	12-13-10	2 lower lateral incisors.	3	3 weeks.
9	H. K.	M. 32	9-11-11	Recession.	2	6 weeks.
10	S. McC.	M. 60	9-21-11	General recession.	4	6 weeks.
11	G. H. M.	F. 40	10-21-11	Recession.	8	2 months.
12	M. McG.	F. 43	9-14-10	General recession.	11	3 months.
13	K. W. M.	F. 29	9-19-10	Recession + inflammation.	7	1 month.
14	E. P. M.	M. 35	10-13-11	Recession.	4	6 weeks.

TABLE II.—

No.	Initials.	Sex and age.	Date.	Teeth affected.	Treatments.	Duration of treatments.
15	A. A.	M. 45	4-1-11	Bleeding + recession.	7	4 weeks.
16	W. B. B.	M. 50	8-19-10	Few molars. Pus.	19	7 months.
17	F. C. B.	M. 29	2-17-10	Bleeding. Right wisdom tooth.	12	9 weeks.
18	L. W. B.	M. 47	7-9-10	Pus + marked recession.	17	6 months.
19	J. B.	F. 43	3-24-10	General recession + pus.	22	7 months.
20	D. J. C.	M. 44	10-7-10	Molars. Pus + inflammation.	8	4 weeks.
21	C. F. C.	F. 41	9-27-09	Recession + anemia. Bleeding.	15	5 months.
22	S. G.	F. 42	11-27-10	Recession + pus.	8	7 weeks.
23	F. R. K.	M. 49	6-7-11	Left upper molars + inflammation.	6	1 month.
24	F. E. K.	F. 33	7-19-10	Upper bicuspids + upper and lower molars.	15	6 months.
25	P. L.	M. 42	7-26-10	Pus, bleeding + recession.	7	2 months.
26	J. M.	M. 33	2-4-10	Pus + recession.	22	6 months.
27	H. F. S.	M. 30	2-13-10	Molars.	18	5 months.
28	E. S.	F. 66	10-4-10	Recession.	3	2 weeks.
29	G. N. T.	M. 46	10-20-11	Bicuspids + molars.	9	9 weeks.
30	S. L.	M. 40	5-14-11	General recession.	4	5 weeks.

Note.—Unless otherwise designated, staphylo. on

escaped the injurious effects of the gastric juice, and finally landed in the intestines.

tion undigested starch remains. The remaining 3 of the 9 cases had an excess of undigested starch remains.

INCIPIENT CASES.

Bacteriological findings.	Opsonic indices. Pn.	staph.	strep.	col.	Results.	Other symptoms.
Pneumo. in chains	.....				Markedly Imp.	Secondary anemia. Menorrhagia.
Pneumo. + staphylo.	.....				Cured. 3 months.	Hypo-thyroidism. Staphylo. skin infection.
Pneumo. + staphylo. Few macro.	.....				Cured. 22 months.	Rheumatism. Intestinal flatulence.
Staphylo. Some pneumo.	.....				Cured. 4 months.	Hypo-thyroidism. Rheumatism. Intestinal flatulence.
Pneumo. + staphylo.	.....				Cured. 7 months.	Rheumatism. Intestinal flatulence.
Pneumo.	.....				Cured. 15 months.	Acne. Intestinal flatulence.
Staphylo. + pneumo. in chains.	.65	.69	.98	1.08	Cured. 27 months.	Indigestion. Rheumatism.
Sterile.	.76	.67		.72	Cured. 20 months.	Severe headaches.
Pneumo. Few staphylo.	.....				Cured. 1 year.	Stomach + intestinal flatulence.
Staphylo. + strepto.	.....				Cured. 11 months.	Empyema of left antrum. Facial eczema.
Pneumo. + staphylo.	.....				Cured. 10 months.	Chronic post nasal catarrh + bronchitis.
Pneumo. + staphylo.	.....				Cured. 21 months.	Asthma. Rheumatism.
Pneumo. + staphylo. Some macro.	.73			.70	Cured. 2 years.	Indigestion.
Pneumo. + staphylo.	.....				Cured. 10 months.	Acne. Intestinal fermentation.

MODERATELY ADVANCED CASES.

Bacteriological findings.	Opsonic indices. Pn.	staph.	strep.	col.	Results.	Other symptoms.
Pneumo. + macrodiplo.	.....				Cured. 17 months.	Psychasthenia.
Pneumo. + staphylo.	.78	.75	.76	.87	Cured. 17 months.	Rheumatism.
Pneumo. in chains + staphylo.	.....				Cured. 2½ years.	
Staphylo. + some diplo.	.....				Cured. 2 years.	Muscular rheumatism. Intestinal flatulence.
Pneumo. + staphylo.	.73	.57		.78	Cured. 2 years.	Muscular rheumatism.
Pneumo. in chains. Few staphylo.	.....				Cured. 2 years.	Muscular rheumatism. Intestinal flatulence.
Pneumo.	.59	.73	.85	.62	Cured. 3 years.	Intestinal flatulence.
Sterile.	.66	.82		.83	Cured. 19 months.	Gastritis + rheumatism.
Pneumo. + yeast fungi. Many long thin bacilli.	.....				Cured. 14 months.	Chronic furunculosis. Intestinal flatulence.
Pneumo.	.75	.83			Cured. 20 months.	
Pneumo. + staphylo.	.....				Cured. 1 year.	Marked intestinal fermentation.
Pure staphylo.	1.18	.67	.73	1.16	Cured. 2 years.	Intestinal fermentation. Chronic furunculosis.
Pneumo. + staphylo.	.68	.75	1.13	.68	Cured. 2 years.	Chronic sore throat.
Pneumo. + macrococci.	.52	.88	.96		Cured. 23 months.	Rheumatism. Indigestion.
Pneumo. + staphylo.	.....				Cured. 8 months.	Intestinal flatulence.
Pneumo.	1.30	1.04			Improved.	Asthma. Intestinal flatulence.

these charts refers to staphylococcus aureus.

The chemical examinations were made in 9 of the 14 cases; 6 showed undigested meat remains; 2 of these 6 had in addi-

Carbohydrate fermentation was present in 3 cases, meat fermentation or putrefaction in 4 cases, while 2 others

had a combination of meat and carbohydrate fermentation. These cases showed a tendency to an improper digestion of meat foods rather than of starchy foods, in the proportion of 6 to 3. The old idea of eliminating meat in this disease, which was found empirically to be of value, is here corroborated by actual analysis.

Group II: *Moderately Advanced Stage* (16 *cases*).

Description. The cases under this heading are those in which the disease was much farther advanced than in the previous group. The gums on the whole were found congested and inflamed at the margins. Around most of the teeth they were either spongy (hypertrophied) or showed marked recession (atrophied). Bleeding was producible in all cases by the slightest touch. Visible pus was present in all cases, and it could easily be squeezed out by pressure over the affected part. The number of teeth affected in this group ranged from one to several, but the looseness was not very marked, and only in a few of the teeth. All the patients in this group complained of local discomfort and tenderness and difficulty in chewing. All of them were definitely aware that they had gum trouble which they wanted to have treated.

Bacteriological findings. The direct smear findings have already been described. Cultural findings are—

Pneumo. and staphylo.	8 cases.
"	6 "
Staphylo.	1 case.
Sterile	1 "

In this group, as in the preceding, the predominating organism found culturally was the pneumo. in chains. The number of cases that showed a pure growth of pneumo. was greater than in the incipient cases. No definite explanation could be given for the case that was found sterile culturally.

Opsonic findings. Of the 16 cases, 9 were tested opsonically; 7 were found below normal to pneumo. and one above normal. Of these 8 with an abnormal opsonic index to pneumo., 4 were also low to staphylo., 1 to strepto., and 3 to B. coli, while they were normal to the other pathogenic organisms tested. Of the 9 cases tested, 1 was normal to pneumo. (1.18); the cultures from the gums of that case showed a pure growth of staphylo. The index to staphylo. in this case (No. 26, J.M.) was very low (0.67), slightly low to strepto. (0.73), and normal to colon (1.16).

Treatment. The average number of treatments in this group was twelve, with a maximum of twenty-two and a minimum of three, at an interval of five days in the beginning, to two weeks or longer later, according to the amelioration of the condition. The average duration of treatment was three and one-half months —with a maximum of seven months and a minimum of two weeks.

Results. Of the 16 cases, 15 were cured and one was benefited. This last patient discontinued treatment at the end of five weeks, after he had received four treatments. The teeth stopped troubling him, and he thought that he had done his share toward them.

Of the cured cases, 2 remained cured for from thirty to thirty-six months, 7 from twenty to twenty-three months, 4 from fourteen to nineteen months, and 2 from eight to twelve months. The process, apparently, even in these cases did not as yet reach to necrosis of bone, at

least not to any extensive necrosis. Of course this is merely a supposition, as no pathological specimens could have been examined, for obvious reasons.

Systemic disorders. Of the 16 cases in this group, 2 suffered from rheumatism, 4 from rheumatism and gastro-intestinal disturbances, 3 had gastro-intestinal disorders, 1 had asthma and intestinal flatulence, 2 had chronic furunculosis and intestinal fermentation, 1 chronic sore throat, and 1 a nervous break-down (psychasthenia); 2 had no general symptoms.

The rheumatic disturbances were muscular as well as joint affections. The pain in these cases yielded promptly to the vaccine treatment, while the ultimate good results may also be ascribed to the overcoming of the local affection.

Urinalysis. The urine was examined in 13 of the 16 cases. In none was there found any albumin or sugar. The reaction was found acid in all, and the indican abnormally high in 4. Here, too, the presence of indicanuria is the only thing to be commented upon.

Feces examination. The stool was examined bacteriologically in 12 of the 16 cases. The cultural findings were: Pure colon in 9 cases, colon and diplo. (pneumo.) in 3 cases. The pneumococci were found in this group in about the same percentage—33 per cent.—as in the preceding group.

The feces were examined chemically in only 5 of the 16 cases, 4 of which showed a great excess of undigested meat remains, while the 5th was found normal in all respects. The fermentation test in these 4 cases was marked by a violent gas fermentation, acid change, and a typical picture of carbohydrate fermentation. No deductions, of course, can be made from the small number examined.

Group III: *Far Advanced Stage (85 cases).*

Description. The cases under this heading were the advanced cases with marked suppuration, the symptomatic picture of which is well known to you all. The lesions varied from looseness of a few teeth, with marked recession, sponginess, suppuration, and deep-seated sinus formation of the affected teeth, to conditions in which all the teeth were found affected. In some of the cases there were also present necrosis, destruction of the alveolar process, and displacement of the teeth. In a few cases the disease was marked by a series of acute exacerbations in individual teeth, with marked swelling and excruciating pain, coming on all of a sudden and continuing until the affected tooth was removed. Such patients lost three to five teeth in that way before they were referred for vaccine treatment. The majority of the cases in this group, however, were of the slow, insidious, chronic type, with little pain except on mastication. All of the cases had systemic disturbances of one form or another.

Bacteriological findings. The findings of the direct smears of the pus have been described elsewhere. The cultural findings are—

	Cases.
Pneumo. (strepto. lanceolatus pneumoniæ)	18
Staphylo.	1
Pneumo. and staphylo.	49
" " strepto.	3
" staphylo., and strepto.	10
" and M. catarrhalis	1
" and mucos. capsul.	1
Staphylo. and M. catarrhalis	2
Total	85

By far the most frequent organism according to this table is the pneumo. in chains, either alone or in combination

TABLE III.—FAR

No.	Initials.	Sex and age.	Date.	Teeth affected.	Treatments.	Duration of treatments.
31	W. L. A.	M. 40	11-10	All.	?	?
32	F. A.	M. 66	5-16-11	Looseness of teeth. Marked recession.	7	3 months.
33	W. B.	F. 46	8-18-10	All.	13	4 months.
34	M. F. B.	F. 54	6-29-11	Cuspids + bicuspids markedly. Others slightly.	3	2 weeks.
35	A. F. B.	F. 63	1-12-11	1 upper + 2 lower teeth.	6	4 weeks.
36	A. A. B.	F. 55	2-25-11	Upper + lower incisors markedly.	11	3 months.
37	E. B.	F. 28	9-14-10	Lower molars.	3	11 days.
38	J. P. B.	M. 57	7-21-11	Lower incisors. One bicuspid.	?	2 months.
39	J. B. B.	M. 47	12-23-11	Almost all.	?	.....
40	A. H. B.	M. 46	4-30-10	Lower molar markedly. Others slightly.	8	1 month.
41	M. B.	F. 26	11-1-09	Marked recession.	12	2 months.
42	J. H. B.	F. 49	10-30-09	All.	11	6 months.
43	L. A. B.	F. 43	11-12-09	Several teeth. General recession.	14	3 months.
44	S. E. C.	F. 72	10-26-11	General recession. Several teeth.	11	8 weeks.
45	F. C.	F. 55	6-16-10	All. Very marked recession.	12	2 months.
46	H. S. C.	F. 56	4-22-10	All.	34	8 months.
47	R. F. D.	M. 60	8-19-10	All.	?	?
48	A. M. D.	F. 34	11-30-09	Several teeth. Marked recession.	26	5 months.
49	C. T. D.	M. 55	4-13-11	Lower incisors markedly. Others slightly.	8	6 weeks.
50	C. J. D.	M. 38	2-17-10	Several teeth.	28	5 months.
51	J. D.	M. 44	11-11-10	All, very badly.	13	3 months.
52	A. E.	F. 51	1-9-11	Lower front.	33	5 months.
53	A. W. F.	M. 53	4-22-09	Several teeth.	7 (irreg.)	11 months.
54	M. F.	M. 51	10-25-11	Several teeth.	6	5 weeks.
55	A. F.	F. 34	7-21-10	Lower rt. incisor.	29	9 months.
56	L. A. G.	M. 50	3-31-10	All.	12	10 weeks.
57	H. G.	M. 28	4-23-10	Several teeth.	?	?
58	H. F. G.	F. 35	7-8-10	All.	?	?
59	G. A. H.	M. 37	3-6-12	First upper molar. Lower left incisor.	6	5 weeks.
60	R. H.	M. 42	3-21-12	14 lost from looseness. 2 very bad now.	27	3 months.
61	W. W. H.	M. 40	6-23-09	All upper teeth. Lower incisors.	6	5 weeks.
62	A. S. H.	M. 52	9-9-10	Right lower molar.	?	3 months.
63	F. E. H.	M. 59	4-4-11	3 teeth.	No record.	?
64	C. F. H.	F. 50	10-1-10	All.	8	2 months.
65	H. H.	F. 33	11-12-10	All (acute case).	3	1 week.
66	S. E. J.	F. 30	1-10-10	All.	18	6 months.
67	P. A. J.	M. 36	1-12-10	4 teeth.	19	5½ months.

ADVANCED CASES.

Bacteriological findings.	Opsonic Indices.				Results.	Other symptoms.
	Pn.	staph.	strep.	col.		
Pneumo. + strepto.					Marked imp. at first. Later neglected treatment. Became worse again.	
Pneumo. Some staphylo.					Markedly imp.	Rheumatism. Urticaria.
Pneumo. Some staphylo.					Cured. 20 months.	Chronic constipation + headaches.
Pneumo. + staphylo.					Imp.	Intestinal flatulence. Rheumatism.
Strepto. Pneumo. Few staphylo.	.69	.94		.68	Markedly imp. 19 months.	Intestinal flatulence. Rheumatism.
Pneumo. in chains. Strepto.	.53	.57		.80	Cured. 15 months.	Pyelitis and cystitis.
Pneumo. Staphylo. Few macro.					Imp.	
Pneumo. Many long + thick bacilli.	.69	1.20	.92		Cured.	
Pneumo. in chains. Staphylo.					Is still under treatment. Imp.	Chronic furunculosis.
Pneumo. + staphylo.	1.10	.72	.90		Markedly imp. 27 months.	Polyarthritis.
Strepto. Pneumo. A few staphylo.	.52		1.22	.68	Cured. 32 months.	Chronic constipation + chr. headache.
Pneumo. + staphylo.	.65	.71		.69	Cured. 28 months.	Intestinal flatulence.
Pneumo.	.70	.55	.97	.50	Cured. 31 months.	Acne. Muscular rheumatism.
Pneumo. + staphylo. Few chains of strepto.					Markedly imp.	Advanced rheumatoid arthritis. Sub-acute inflammatory rheumatism.
Pneumo. + staphylo.	.82	1.17		.68	Cured. 24 months.	General rheumatism.
Staphylo. Some bacilli. Few chains of diplo.					Cured. 21 months.	Rheumatism.
Pneumo.					Imp.	Rheumatism.
Pneumo. Few bacilli + staphylo.	.82	.64	1.09		Imp.	Intestinal flatulence.
Staphylo. Pneumo. in chains. Few strepto.	.77	.58	.96	1.32	Markedly imp.	Intestinal flatulence. Rheumatism.
Pneumo. Strepto.	.58	.90	.93	.66	Cured. 26 months.	Lupus erythematosus. Intestinal flatulence.
Chains of pneumo. Staphylo. + bacilli.	.70	.47		.52	Cured. 17 months.	Gastritis. Rheumatism.
Chains of pneumo. Some macro.	.57	1.38	1.08	.76	Cured. 15 months.	Advanced atrophic arthritis. Arthritis deformans of all joints. Intestinal flatulence.
Principally pneumo. Few staphylo. Few strepto.	.51	.60	.88		Imp.	Intestinal flatulence.
Pneumo. predominating. Few staphylo.					Markedly imp.	Gastritis.
Staphylo.					Cured. 15 months.	Purpura hemorrhagica.
Pneumo. predominating. Some staphylo.	.70	.69	.84	.65	Markedly imp.	Intestinal flatulence. Rheumatism.
Pneumo. Staphylo. Some bacilli.	.74	.85	1.01	.88	Very little imp.	
Pneumo. Staphylo.					No imp.	Intestinal flatulence. Rheumatism.
Pneumo. Staphylo.					Cured. 5 months.	Chronic furunculosis. Intestinal flatulence.
Staphylo. + pneumo.					Markedly imp.	Carbuncle. Diabetes. Intestinal flatulence.
Principally pneumo. Few staphylo. Few chains of strepto.	.74	.61	.89		Markedly imp.	Rheumatism. Intestinal flatulence.
Pneumo. Staphylo. Strepto.	.50	.73	.85		Cured.	Rheumatism. Chronic head colds.
Pneumo. Staphylo. Macro.					No record obtained.	
Pneumo. predominating. Some staphylo.					Cured. 21 months.	Rheumatism. Eczema.
Many long + short bacilli. M. catarrhalis. Few staphylo.					Cured. 21 months.	Subacute pharyngitis + laryngitis.
Pneumo.	.49		.83		Cured. 26 months.	Intestinal flatulence.
Pneumo.	1.34	.73	.90		Cured. 26 months.	

TABLE III.—FAB

No.	Initials.	Sex and age.	Date.	Teeth affected.	Treatments.	Duration of treatments.
68	J. T. J.	F. 36	11-17-08	4 teeth.	6	4 weeks.
69	M. A. K.	F. 53	3-3-11	All.	9	4 months.
70	C. A. L.	F. 64	10-19-09	All.	13	4 months.
71	W. S. L.	F. 59	12-11-10	Several teeth.	2	1 week.
72	M. S. L.	M. 52	2-24-11	All.	3	2 weeks.
73	T. R. McG.	F. 36	8-19-09	Lower molar.	22	4 months.
74	A. J. McK.	F. 46	2-9-10	Right lower incisor.	9	10 weeks.
75	E. B. McL.	F. 38	1-17-10	All.	?	5 months.
76	H. V. McL.	M. 48	1-12-11	All.	15	6 wks. reg. 5 mos. irreg.
77	J. J. M.	M. 44	2-24-12	3 teeth.	11	2 months.
78	F. M.	F. 36	7-31-11	Upper + lower incisors. 2 bicuspids. 1 molar.	14	4 months.
79	C. H. M.	M. 43	3-29-10	Lower incisors. Upper molars.	28	8 months.
80	C. M.	F. 39	11-17-09	Left lower incisor. All right upper teeth.	35	7 months.
81	F. M.	F. 50	12-31-09	All.	19	6 months.
82	R. N.	M. 45	1-19-10	Lower incisors + lower molars.	27	9 months.
83	H. N.	F. 47	2-8-12	Molars + bicuspids.	15	5 months.
84	W. J. N.	F. 50	3-12-11	All.	11	3 months.
85	E. O. O.	F. 42	6-21-09	All back teeth.	18	3 months.
86	S. L. P.	F. 64	5-29-11	Almost all.	?	4 months.
87	C. C. P.	M. 52	3-19-12	All.	1	.....
88	W. J. P.	M. 40	1-27-11	Several teeth.	2	2 weeks.
89	M. P.	M. 56	11-28-11	All.	16	5 months.
90	G. A. R.	M. 49	11-1-11	General recession.	6	2 months.
91	D. P. R.	M. 34	9-29-10	Upper incisors.	1	.....
92	J. C. R.	M. 43	1-12-10	Front teeth.	?	6 months.
93	G. W. R.	M. 41	12-15-11	All.	12	3 months.
94	S. J. R.	F. 43	12-2-09	All.	5	3 weeks.
95	D. P. R.	M. 41	6-24-10	3 molars.	20	5 months.
96	F. R. R.	M. 57	6-5-11	Upper + lower. Cuspids. molars, incisors.	13	5 months.
97	A. W. R.	M. 61	1-26-10	All.	7	2 months.
98	C. H. R.	F. 37	12-19-11	Several teeth.	5	1 month.
99	M. F. S.	F. 59	10-19-09	All molars.	33	8 months.
100	L. T. S.	F. 34	1-28-10	All.	38	12 mos. irreg.
101	R. S.	F. 37	9-9-10	Several teeth.	1	.....
102	K. J. S.	F. 42	4-14-12	Several teeth.	3	3 weeks.
103	W. H. S.	F. 60	4-4-12	All.	3	10 days.
104	J. H. S.	M. 53	2-28-11	All.	?	4 months.
105	M. S.	M. 40	3-30-09	Several teeth.	25	5 months.
106	F. M. S.	F. 49	9-28-10	All.	22	7 months.
107	G. S.	F. 50	1-22-10	Left lower molars. Right upper molars.	12	2 months.

ADVANCED CASES (*Continued*).

Bacteriological findings.	Opsonic indices.				Results.	Other symptoms.
	Pn.	staph.	strep.	col.		
Predominating pneumo. in chains. Few staphylo.	.52	.68	.88	.84	Markedly imp.	Rheumatism. Colon cystitis.
Pneumo. Staphylo.	.61	.81			Markedly imp.	Rheumatism. Intestinal flatulence.
Pneumo. predominating. Few bacilli.	.66	.77		.74	Markedly imp.	Rheumatism. Intestinal flatulence.
Pneumo.	.83	.68		.74	Markedly imp.	Rheumatism. Intestinal flatulence.
Staphylo. M. catarrhalis. Many fusif. bacilli.	.81	.67		.73	Slightly imp.	
Principally pneumo. in chains. M. catarrhalis.	.61	.42	1.13	.74	Cured. 33 months.	Rheumatism. Intestinal flatulence.
Pneumo. in chains. Few bacilli.	.51	1.06	1.00	1.02	Cured. 28 months.	Rheumatism.
Staphylo. + pneumo.	.62	.85	1.09		Cured. 27 months.	Chronic laryngitis + pharyngitis. Intestinal flatulence.
Staphylo. + pneumo.	.78	1.02	.79	.84	Markedly imp.	Intestinal flatulence.
Pneumo. predominating. Few staphylo.	.....				Cured. 5 months.	Chronic furunculosis. Chr. bronchitis. Intestinal flatulence. Rheumatism.
Pneumo. + staphylo.	.....				Markedly imp.	Intestinal flatulence.
Pneumo. + staphylo.	.78	.85	1.04	.68	Markedly imp.	Rheumatism. Eczema.
Pneumo. predominating. Staphylo.	.68	.72	1.05	.72	Cured. 28 months.	Chr. bronchitis. Post-nasal catarrh. Intestinal flatulence.
Pneumo. in chains. Diplo.	.....				Cured. 20 months.	Rheumatism. Intestinal flatulence.
Pneumo.	.68	1.11	1.07		Cured. 22 months.	Gas + stomach distress. Rheumatism.
Pneumo. predominating. Some staphylo.	.....				Markedly imp.	Rheumatism. Stomach distress.
Pneumo. Macrodiplo.	1.00	1.10	.70	1.04	Markedly imp.	Hay fever.
Pneumo. predominating. Few staphylo.	.....				Imp.	Eczema. Rheumatism. Intestinal flatulence.
Pneumo. Groups of yeast fungi.	.69	.87	1.03	.85	No imp.	Chronic rheumatoid arthritis. Intestinal fermentation.
Pneumo. predominating. Staphylo. A rare bacillus.	.....				Dropped out after 1 treatment.	Catarrh. Obesity.
Pneumo. Yeast fungi.	.52	.55	.85	.76	Imp.	Marked intestinal flatulence.
Strepto. predominating. Staphylo. Pneumo. in chain + diplo. forms.	.66	.80	.82		Markedly imp.	Abscess formation. Stomach distress.
Staphylo. Pneumo.	.....				No imp.	Intestinal distress.
Pneumo. in chains + diplo. Some staphylo.	.52	.80	1.13	.67	Dropped out after 1 treatment.	Psoriasis. Marked intestinal flatulence.
Pneumo.	.48	.57	.93		Cured. 26 months.	Diabetes. Indigestion.
Staphylo. Pneumo.	.....				Markedly imp.	Intestinal flatulence.
Pneumo. Few staphylo.	.65	1.06	.76	.60	Imp.	Rheumatism. Intestinal flatulence.
Pneumo. Staphylo.	.....				Cured. 21 months.	Chronic sore throat.
Pneumo. Some staphylo.	.....				Markedly imp. 9 months.	Intestinal flatulence.
Pneumo. Staphylo.	.73	.70	.42	1.28	Cured. 29 months.	Rheumatism. Fistula in ano.
Pneumo. Staphylo.	.80	.96		.90	Cured. 8 months.	Intestinal flatulence.
Pneumo. in chains + diplo. forms.	.37	.78	.94	.84	Cured. 28 months.	Rheumatoid arthritis. Intestinal flatulence.
Pneumo. Staphylo.	.56	.72	.97		Markedly imp.	Urticaria.
Pneumo.	.....				Dropped out after 1 treatment.	Chronic rheumatism.
Staphylo. Pneumo. Spirillæ.	.....				Markedly imp.	Intestinal flatulence. Rheumatism. Chronic urticaria.
Pneumo. predominating Some staphylo.	.....				Markedly imp.	Marked intestinal flatulence.
Many staphylo. Pneumo. Few chains of strepto.	.60	.82	1.02	1.19	Cured. 16 months.	Stomach distress.
Pneumo. Staphylo.		.59	1.03		Cured. 36 months.	Intestinal flatulence.
Pneumo. Staphylo.	.....				Cured. 15 months.	Rheumatism. Eczema.
Pneumo. Staphylo.	.71	.69	1.04	.83	Markedly imp.	Rheumatism. Intestinal flatulence.

TABLE III.—FAR

No.	Initials.	Sex and age.	Date.	Teeth affected.	Treatments.	Duration of treatments.
108	W. P. S.	M. 52	6-8-11	All.	27	8 months.
109	A. B. S.	F. 41	8-18-10	Several teeth.	14	3 months.
110	L. S.	F. 35	9-8-10	Upper + lower centrals. Bicuspids + molars.	16	4 months.
111	G. M. T.	F. 45	6-4-11	Lower incisors + cuspids. Upper and lower molars.	26	7 months.
112	C. A. V.	M. 72	1-23-11	Left lower molars.	8	2 months.
113	L. W.	F. 45	10-22-11	Several teeth.	6	2 months.
114	F. B. W.	M. 49	10-12-11	Several teeth.	7	2 months.
115	F. H. W.	F. 42	3-2-11	All.	9	3 months.

with the staphylo. The combination of the pneumo., staphylo., and strepto. is next in frequency. The other organisms appeared only rarely.

Opsonic findings. The opsonic index test was made in 49 of the 85 cases, with the following results:

Opsonic index.

	Below normal.	Above normal.	Normal.	Not tested.	Total.
Pneumo.	39	2	7	1	49
Staphylo.	25	1	20	3	49
Strepto.	4	—	32	13	49
Colon (B. coli)	18	3	12	16	49

The opsonic findings in this group, as in the preceding groups, were found, with very few exceptions, to corroborate the cultural findings.

Treatment. The average number of treatments of those that were cured in this group was 17, with a maximum of 38 and a minimum of 3, at intervals of from four to seven days in the beginning up to two to four weeks or longer later, according to the local amelioration of the disease. The *duration* of treatment in the cured cases was on an average four and three-quarter months, with a maximum duration of nine months and a minimum of five weeks.*

Results. In this group of 85 cases, 37 were cured, 40 were markedly benefited, 4 unimproved, and 3 dropped out. One was treated by his dentist and no record obtained from him of the case.

Of the cured cases, 5 remained cured for from thirty to thirty-six months, 11 from twenty-six to twenty-nine months, 8 from twenty to twenty-four months,

* One case (No. 65, H.H.) in this group is recorded as cured at the end of one week, after receiving three treatments. She had an acute osteomyelitis of the socket of the lower left third molar. The tooth was removed, and the socket curetted. She was brought to me by her physician for vaccine treatment three weeks after the operation. She had a high temperature and felt very sick all over. Locally there was a big bole discharging pus at the place where the tooth had been removed. All the other teeth were loose, and pus present around several of them. The gums as a whole were markedly inflamed. At the end of three treatments the whole condition of the gums subsided and the operated socket made an uneventful recovery. When she was last seen, nineteen months later (July 10, 1912) the gums were found in healthy condition and no looseness of teeth was present.

ADVANCED CASES (*Continued*).

Bacteriological findings.	Opsonic indices.	Results.	Other symptoms.
	Pn. staph. strep. col.		
Pneumo. Few chains of strepto. Staphylo. Many long bacilli.	1.36 .94 1.13	Markedly imp.	Rheumatism. Intestinal flatulence.
Pneumo. predominating. Staphylo. in groups.	.....	Cured. 2½ years.	Rheumatism. Dermatitis exfoliativa.
Many chains of pneumo. Some staphylo. Few macro.	.....	Cured. 19 months.	Rheumatism.
Pneumo. + Muc. capsul.	.....	Cured. 9 months.	Rheumatism. Intestinal fermentation.
Pneumo. Diplomacro.	.65 1.03 1.24	Cured. 1½ years.	Rheumatism. Intestinal flatulence.
Pneumo. Staphylo.	.....	Imp.	Severe rheumatism.
Pneumo. Staphylo.	.....	Imp.	Rheumatism. Intestinal flatulence.
Some diplomacrococci. Pneumo. Staphylo.	.64 1.18	Cured. 15 months.	Rheumatism. Intestinal flatulence.

9 from fifteen to nineteen months, and 5 from five to twelve months. The improved cases remained improved for several months or years, some getting progressively better even after discontinuing treatment, while others remained stationary.

The permanence of cure in this group is, of course, as would be expected, smaller than in the earlier groups—43 per cent. as compared with 91 per cent. in the former two. However, the dentists who, following a prolonged local treatment, sent those cases to me have assured me that practically all these far advanced cases would have gone on progressively from bad to worse, until all the teeth would have been lost. Under such circumstances 43 per cent. of cured and 47 per cent. markedly improved is, I believe, very encouraging.

Systemic disorders. Of the 85 cases, 45 suffered from rheumatism, 42 had gastro-intestinal disturbances, 3 had chronic furunculosis, 4 post-nasal catarrh and chronic sore throat, 2 had diabetes, and 3 nephritis; besides, 4 had eczema, 3 urticaria, and 1 purpura hemorrhagica. Most of the patients had a combination of two or more of the above systemic troubles.

The cases with rheumatism in this group were of the most advanced types of polyarthritis, arthritis deformans, or severe general muscular rheumatism. The severity of the rheumatic symptoms seemed to be in direct relation to the severity and chronicity of the alveolar osteomyelitic condition, and the improvement of the two were also in direct relation to each other. Of these rheumatic cases, 23 were cured or relieved, 11 were improved, 1 showed no improvement, and 1 was slightly improved. The others either discontinued treatment against advice or were beyond any hope at the beginning of the treatment.

Almost all of those suffering from gastro-intestinal disturbances were relieved or cured by diet, lactic acid milk, and vaccine. The same was true of the eczema, chronic urticaria, and chronic furunculosis cases. (See Table III.) Only 6 of the 85 cases showed no general symptoms.

Urinalysis. The urine was examined in 53 of the 85 cases. Of these, 44 were found acid in reaction, 7 alkaline, and

2 neutral. In 27 of the 85 cases marked indicanuria was present; 3 of the cases showed albumin, and 2 sugar.

Feces examination. The feces were examined bacteriologically in 52 of the 85 cases, with the following results:

B. coli (colon)	39 cases.
" and diplo.	11 "
" " strepto.	2 "

In this group we find in addition to the presence of pneumo. in the feces, also two cases with strepto. It is difficult to determine what these findings actually mean. but, as said before, it may be supposed that they are an extension of the infection due to the swallowing of the pus.

The feces were examined chemically in 30 of these cases: 19 showed an excess of undigested meat remains; the other 11 showed an excess of undigested starch remains. The fermentation test in 11 of the 19 cases that showed an excess of undigested meat showed putrefactive changes, while the remaining 8 showed a carbohydrate fermentation with marked gas formation. All those 11 cases that had an excess of undigested starch remains also showed a typical picture of carbohydrate fermentation. with very marked gas formation.

These findings again seem to indicate, as in the preceding groups. the tendency to an improper digestion of meat in the majority of cases—63 per cent. On the other hand, it also shows the presence in the lower part of the bowels in the majority of cases of an excessive flora capable of fermenting carbohydrates with the production of gas, which is responsible for the flatulence complained of by so many patients.

General Summary.

The causes of the disease, as we said, are mechanical and infectious. Under mechanical causes I called attention to tartar and calculi, which are by far the most important. To these may be added the careless use of the tooth-brush and infected instruments.

The important infectious agents, we said, are the pus-producing bacteria, such as pneumo., staphylo., strepto., and M. catarrhalis. As stated, the disease is not in all cases due to one and the same organism, but to a variety of organisms capable of causing infection. The bacteria are responsible for keeping up the disease, though mechanical injuries are responsible for starting it. The same is true of the systemic disorders, which may play only a secondary part (lowered resistance) in starting this local disease, while after it is once established the systemic diseases certainly play an important part in keeping it up.

The results obtained in this series of 115 cases treated with vaccines are (A)

The number and duration of treatments of this series were—(see B)

Thus, according to the above figures, the number of cures, the duration of treatment, and the number of treatments

(A)

Stage.	Percentage—			No. of cases—		
	Cured.	Impr.	No impr.	Cured.	Impr.	No impr.
Incipient (Group I)	92	8	—	13	1	—
Mod. advanced (" II)	93	7	—	15	1	—
Far advanced (" III)	43	47	5	37	40	4

(Of the far advanced, 3 dropped out and of 1 no record was obtained.)

(B)

Stage.	No. of treatments. Average.	Max.	Min.	Duration. Average.	Max.	Min.
Incipient (Group 1)	6	11	2	6½ wk.	12	3 wk.
Mod. advanced (" II)	12	22	3	3½ mo.	7	2 "
Far advanced (" III)	17	38	3	4¾ "	9	5 "

(C)

Stage.	Percentage— Rheumatism.	Gastro-intest.	Skin affections.	Chronic catarrh.
Incipient (Group 1)	35	50	14	7
Mod. advanced (" II)	38	50	12	6
Far advanced (" III)	53	50	13	5

are in direct relation to the chronicity and severity of the disease, particularly the former, as would be expected.

The frequency with which the most important systemic disorders occurred in the whole series is—(see c)

The rheumatic disturbances are apparently in direct relation to the severity of this disease. They increase both in frequency and severity as the disease goes on. The other important complaints are the gastro-intestinal disturbances and neuralgic pains, so called. All the patients seemed to be particularly susceptible to acute coryzas, or "colds," which were at times sufficiently severe to lay them up in bed.

Various other affections were met with, such as asthma, diabetes (2 cases), nephritis (3 cases), purpura hemorrhagica (1 case); but I feel from their rarity that they were not necessarily related to the chronic alveolar osteomyelitis.

The systemic affections accompanying this disease are of great importance, as shown by the above figures, and are to be taken into consideration by the dentist, who at the present day and for many days to come will be the only one to tell the physician of the existence of this disease and make him acquainted with its consequences. These systemic diseases are all ordinarily treated merely symptomatically, while no attention is paid to the local trouble. There is a crying need to get the medical profession awakened to the consequences of this disease, and to consider no physical examination complete without the routine examination of the gums.

Conclusions.

(1) Pyorrhea alveolàris, so called, is in reality a *chronic alveolar osteomyelitis.* It should be known and treated as such.

(2) The sockets are enlarged medullary spaces of the maxillary bones, while the so-called "peridental membrane" is in reality a ligament which keeps the tooth suspended in the alveolar cavity.

(3) The mechanical causes are responsible for starting the disease, while the pyogenic bacteria are responsible for keeping it up—pneumococcus, staphylococcus, streptococcus, and M. catarrhalis.

(4) Chronic alveolar osteomyelitis is a specific disease, though not in the sense that it is always due to one and the same organism; it is due to a variety of organisms, already enumerated.

(5) Systemic diseases play only a secondary part in starting the disease, but may be caused by it, and in turn become responsible for keeping up the local condition.

(6) A great many rheumatic diseases, so called, also a great many gastro-intestinal affections, are, in my opinion, directly related to chronic alveolar osteomyelitis—"Riggs' disease."

(7) The vaccine treatment of this disease, together with the proper attention to diet, cures or relieves the systemic diseases, especially the rheumatic affections.

(8) Vaccine treatment (immuno-therapy), together with local mechanical treatment, yields by far the best results in this intractable disease — CHRONIC ALVEOLAR OSTEOMYELITIS.

Case Reports.

GROUP I: *Incipient Stage* (14 *cases*).

[All the cases were treated with autogenous vaccine in combination with the corresponding stock vaccines (pneumo. and staphylo. stock vaccines usually.]

(1) C. O. B. July 22, 1911. Female, 48 yrs. Gums swollen, bleed easily, receded over left lateral incisors. Continuous menorrhagia with marked secondary anemia; intestinal flatulence. Treated 1 mo. (2 tr.). Gums improved; good in color, no bleeding. General symptoms improved. A year later, gums still in good condition.

(2) L. H. B. May 8, 1912. Male, 30 yrs. General recession of gums, inflamed at margins. Cultures showed pneumo. and staphylo. Chronic constipation; skin of hands cracked and dry (hypothyroidism). Treated 2 mo. (8 tr.). Gums cured. Other symptoms relieved by thyroid. No recurrence.

(3) E. C. Aug. 18, 1910. Female, 35 yrs. Recession of gums, hoggy and inflamed at margins. Cultures showed pneumo., staphylo., and macrococci. Rheumatism, intestinal flatulence, chronic constipation, general debility. Treated 2 mo. (7 tr.). Gums healthy and firm. Other symptoms relieved. No recurrence, 22 mo.

(4) G. L. D. Mar. 25, 1912. Female, 44 yrs. Recession and slight inflammation of gums; visible pus present in two sockets. Cultures showed staphylo. and some pneumo. Articular rheumatism, general adiposity (hypothyroidism?), intestinal flatulence. Treated 10 weeks (9 tr.). Gums healthy, no pus. Rheumatism relieved. Lost 28 pounds by diet and thyroid.

(5) S. W. D. Feb. 10, 1912. Male, 29 yrs. General recession of gums, pale and inflamed at margins. Cultures showed pneumo. and staphylo. Intestinal fermentation, rheumatic pains (muscular) and lameness; psychasthenia. Treated 4 weeks (4 tr.). Gums healthy in color; no inflammation. Feeling well otherwise.

(6) R. E. May 9, 1911. Female, 25 yrs. Recession of gums; bleed easily, inflamed at margins: little visible pus present in three sockets. Cultures showed pneumo. Pustular acne, intestinal flatulence, and chronic constipation. Treated 7 weeks (9 tr.). Gums healthy, no bleeding nor pus. No recurrence. Acne improved.

(7) H. H. Apr. 30, 1910. Female, 35 yrs. Recession, tenderness, and inflammation of gums of five years' duration. Bad taste in mouth. Cultures showed staphylo. and chains of pneumo. Indigestion, chronic constipation, rheumatic pains. Treated 5 weeks (5 tr.). Gums not inflamed, and feels well. Other symptoms relieved. No recurrence.

(8) C. M. K. Dec. 13, 1910. Female, 28 yrs. Recession of gums increasing gradually for seven years. Cultures sterile. General malaise, severe neuralgic headaches. Treated 5 weeks (3 tr.). Recession checked, 20 mo. Other symptoms relieved.

(9) H. K. Sept. 11, 1911. Male, 32 yrs. Gums receded, hoggy and inflamed at margins. Cultures showed pneumo. and few staphylo. Marked gastro-intestinal disorders. Treated 6 weeks (2 tr.). Gums firm and healthy. No recurrence. Other symptoms improved.

(10) S. W. M. Sept. 21, 1911. Male, 60 yrs. Recession and slight inflammation of gums. Cultures showed staphylo. and strepto. Chronic empyema of left antrum; facial eczema. Treated 6 weeks (4 tr.). Gums healthy, recession checked. Antral trouble improved; skin well. (Continuing vaccine treatment for antrum by family physician.)

(11) G. H. M. Oct. 21, 1911. Female, 40 yrs. Recession, sponginess, and bleeding of gums. Cultures showed pneumo. and staphylo. Chronic bronchitis, "continuous colds," general malaise, constipated. Treated 2 mo. (8 tr.). Gums firm, no bleeding. Bronchitis and "colds" relieved. No recurrence.

(12) M. M. Sept. 14, 1910. Female, 43 yrs. Recession, bleeding and hogginess of gums; little visible pus present. Cultures showed pneumo. and staphylo. Asthma, rheumatism. Treated 3 mo. (11 tr.). Gums firm, no pus, looking healthy. Other symptoms relieved. No recurrence, 21 mo.

(13) K. W. M. Sept. 19, 1910. Female, 29 yrs. Gums receded and inflamed, bleed easily, tender; gumboils present. Cultures showed pneumo., staphylo., and macro. Stomach and intestinal distress and gas. Treated 1 mo. (7 tr.). Gums in good condition. Other symptoms somewhat relieved. (Left town.)

(14) E. M. P. Oct. 13, 1911. Male, 35 yrs. Recession around a few teeth; one tooth slightly loose. Chronic pustular acne, distress in stomach, and intestinal fermentation. Cultures showed pneumo. and staphylo. Treated 6 weeks (4 tr.). Gums in good condition; tooth firm. Acne improved (is still being treated for it); otherwise well.

Group II: *Moderately Advanced Stage* (16 *cases*).

(15) A. A. Apr. 1, 1911. Male, 45 yrs. General recession and bleeding of gums with some visible pus around lower bicuspid. Cultures showed pneumo. and macro. Psychasthenia. Treated 4 weeks (7 tr.). Recession checked; no pus or tenderness. Other symptoms improved. No recurrence, 17 mo.

(16) W. B. B. Aug. 19, 1910. Male, 50 yrs. Gums receded and inflamed; pus present round few molars for several years; lost one molar. Pain on mastication. Cultures showed pneumo. and staphylo. Rheumatic pains; general debility. Treated 7 mo. (19 tr.). Gums healthy; no tenderness or pus. No recurrence, 18 mo. Other symptoms relieved.

(17) F. C. B. Feb. 17, 1910. Male, 29 yrs. Marked recession of gums; bleeding; pus in socket of right third molar. Cultures showed pneumo. in chains and staphylo. Treated 9 weeks (12 tr.). Marked improvement after second treatment. Gums in good condition, 2½ yrs.

(18) L. B. July 9, 1910. Male, 47 yrs. Receded, hoggy, and inflamed gums; some pus visible; few teeth slightly loose. Cultures showed staphylo. and pneumo. Marked rheumatic pains, intestinal flatulence, chronic constipation. Treated 6 mo. (17 tr.). Teeth firm at 8 weeks. Continued treatment for rheumatism, of which he was finally relieved. Gums healthy in color, no pus. No recurrence.

(19) J. B. Mar. 24, 1910. Female, 43 yrs. Marked recession; pus visible; teeth slightly loose. Cultures showed pneumo. and staphylo. Muscular rheumatism, chronic constipation, general debility. Treated 7 mo. (22 tr.). Teeth firm; recession checked. No recurrence, 2 yrs. Other symptoms relieved.

(20) D. J. C. Oct. 7, 1910. Male, 44 yrs. Gums inflamed and receded; pus present in several sockets. Cultures showed pneumo. in chains and groups, and staphylo. Muscular rheumatism, intestinal flatulence, and constipation. Treated 4 weeks (8 tr.). Inflammation subsided. Recession checked. No recurrence, 2 yrs. Other symptoms improved.

(21) C. F. C. Sept. 27, 1909. Female, 41 yrs. Gums receded and anemic, tender, and bleed; front teeth "too long." Cultures showed pneumo. Intestinal flatulence, chronic constipation. Treated 5 mo. (15 tr.). Gums in good condition. 36 mo. Other symptoms relieved.

(22) S. G. Nov. 27, 1910. Female, 42 yrs. Recession and bleeding of gums; very little pus present. Cultures sterile. Rheumatism, gastritis, intestinal flatulence. Treated 7 weeks (8 tr.). Recession checked. No recurrence, 19 mo. Other symptoms improved.

(23) F. R. K. June 7, 1911. Male, 49 yrs. Gums receded, inflamed, and hoggy; several teeth loose; visible pus. Cultures showed pneumo., yeast fungi, and many long, thin bacilli. Chronic furunculosis, intestinal flatulence. Treated 1 mo. (6 tr.). Gums looked healthy; teeth firm; recession checked. No recurrence, 14 mo. Other symptoms relieved. Furunculosis cured.

(24) F. E. K. July 19, 1910. Female, 33 yrs. Marked recession; pus present in sockets of upper bicuspids and molars and lower molars. Seven years' duration. Cultures showed pneumo. General adiposity, intestinal flatulence. Treated 6 mo. (15 tr.). Gums harder and good color; recession checked; no pus. No recurrence. Other symptoms relieved.

(25) P. L. July 26, 1910. Male, 42 yrs. Gums receded, tender, and bleed easily; three teeth loose; pus in sockets of several teeth. Cultures showed pneumo., staphylo., and macrococci. Marked intestinal fermentation, stomach distress, general malaise. Treated 2 mo. (7 tr.). Gums seem healthy; teeth firm; no pus. No recurrence, 12 mo. Other symptoms relieved.

(26) J. M. Feb. 4, 1910. Male, 33 yrs. General recession; gums tender; pus in several sockets. Cultures showed pure staphylo. aur. Treated 6 mo. (22 tr.). Gums in healthy condition; no pus. No recurrence, 24 mo. Other symptoms relieved.

(27) H. F. S. Feb. 13, 1910. Male, 30 yrs. Gums hoggy and inflamed, bleed easily, receded in places; pus in several sockets. Pneumo. and staphylo. on cultures. Constipation, chronic tonsillitis. Treated 5 mo. (18 tr.). Gums in healthy condition. No recurrence, 24 mo. Other symptoms improved.

(28) E. S. Oct. 4, 1910. Female, 66 yrs. Gums spongy and inflamed. Root with crown on, loose, pus around it. Cultures showed pneumo. and many macrococci. Indigestion, gas in stomach and bowels, rheumatism. Was advised to have root removed. Treated 2 weeks (3 tr.). Gums healthy. No recurrence. Other symptoms relieved.

(29) G. N. T. Oct. 20, 1911. Male, 46 yrs. Marked recession; gums tender, bleed easily; pus present in a few sockets. Cultures showed staphylo. and pneumo. Intestinal flatulence, general malaise. Treated 9 weeks (9 tr.). Gums in healthy condition. No recurrence, 8 mo. Other symptoms improved.

(30) S. L. May 14, 1911. Male, 40 yrs. Recession of gums; a little visible pus; teeth slightly loose. Pneumo. on cultures. Stomach distress. asthma, intestinal flatulence. Treated 5 weeks (4 tr.). Gums improved. (Discontinued treatment against advice.)

Group III: *Far Advanced Stage* (85 *cases*).

(31) F. A. May 16, 1911. Male, 66 yrs. Marked recession and looseness of all teeth; profuse suppuration. Pneumo. and staphylo. on cultures. Rheumatism, intestinal flatulence, and urticaria. Treated 3 mo. (7 tr.). Gums markedly improved; teeth firmer; very little pus. Feeling generally better.

(32) W. B. B. Aug. 19, 1910. Female, 46 yrs. Marked recession. Gums painful and sensitive; one tooth very loose, others slightly loose. Much pus. Pneumo. and staphylo. on cultures. Chronic constipation, headaches, general malaise.

Treated 4 mo. (13 tr.). Gums in healthy condition; no pus; loose teeth tightened up. No recurrence, 21 mo. Other symptoms relieved.

(33) M. F. B. June 29, 1911. Female, 54 yrs. Bleeding and soreness of gums; several teeth loose; lost one tooth from looseness. Eczema and intestinal flatulence. Treated 2 weeks (3 tr.). Gums improved. Other symptoms benefited. (Discontinued treatment.)

(34) W. A. Nov. 1910. Male, 45 yrs., traveling salesman. Marked recession; all teeth loose; marked suppuration; severe pain on mastication. Treated irregularly for several months. Gums slowly improved. (Became discouraged at slow progress; had all teeth removed against advice, and artificial dentures put in.)

(35) A. F. B. Jan. 12, 1911. Female, 63 yrs. Marked recession and tenderness; two teeth very loose; lost two teeth from looseness; considerable pus. Strepto., pneumo., and staphylo. on cultures. Rheumatism, chronic constipation. Treated 4 weeks (6 tr.). Gums markedly improved and feel comfortable; teeth firmer. (Discontinued treatment against advice.)

(36) A. A. B. Feb. 25, 1911. Female, 55 yrs. Gums markedly receded; several teeth very loose; pus in many sockets. Cultures showed pneumo. in chains and strepto. Colon cystitis and pyelitis of 20 years' standing. Treated with B. coli (autogenous) of urine, and autogenous vaccine of gum pus for 3 mo. (11 tr.). Gums healthy; teeth firm; no pus. Other symptoms relieved. No recurrence, 16 mo.

(37) E. B. Sept. 14, 1910. Female, 28 yrs. Gums boggy and inflamed; several teeth loose; abundant pus. Pneumo. and staphylo. on cultures. Convalescing from abdominal operation. Treated 11 days (3 tr.). Gums looked better. (Discontinued treatment against advice.)

(38) J. P. B. Mar. 4, 1911. Male, 57 yrs. Lower incisors and one bicuspid loose; pus in sockets of loose teeth; general recession of gums. Pneumo. and many long, thick bacilli on cultures. Treated irregularly 6 weeks. Gums improved; teeth firmer. General health improved.

(39) J. B. B. Dec. 23, 1911. Male, 47 yrs. Several teeth loose, several lost from looseness. Abundant pus. Cultures showed staphylo. and pneumo. Chronic furunculosis, chronic constipation. Still under treatment (by dentist). Gums markedly improved; teeth firmer. Other symptoms relieved.

(40) A. H. B. Apr. 30, 1910. Male, 46 yrs. Lost six teeth from looseness; one tooth very loose, several slightly. Profuse pus. Pneumo. and staphylo. on cultures. Polyarthritis, general debility. Treated 1 mo. (8 tr.). All but the very loose tooth tightened up; pus greatly diminished; mouth looked better generally. Obliged to discontinue treatment. Heard from 30 mo. later: Very loose tooth dropped out; other teeth well; gums in healthy condition.

(41) M. B. Nov. 1, 1909. Female, 26 yrs. Gums show general recession, are sensitive, discolored, and boggy. Little pus. Cultures showed strepto., pneumo., and staphylo. aur. Chronic constipation, headaches, general malaise. Treated 2 mo. (12 tr.). Gums healthy. No recurrence, 32 mo.

(42) J. H. B. Oct. 30, 1909. Female, 49 yrs. Lost all upper and several lower teeth from looseness, all remaining teeth loose; gums tender, receded, painful on mastication. Cultures showed pneumo. and staphylo. Indigestion, flatulence, headaches, and general malaise. Treated 6 mo. (11 tr.). Gums well; no pus; no tenderness on chewing; teeth firmer. General health improved.

(43) L. A. B. Nov. 12, 1909. Female, 43 yrs. Gums tender, bleed easily; several teeth slightly loose; pus present in sockets. Pustular acne, muscular rheumatism. Treated 3 mo. (14 tr.). Teeth firm; no tenderness of gums. Other symptoms relieved. No recurrence, 21 mo.

(44) S. E. G. Oct. 26, 1911. Female, 72 yrs. Gums receded, tender, and inflamed, three loose teeth, several lost from looseness. Pus in sockets. Staphylo., pneumo. in chains, and strepto. on cultures. Advanced rheumatoid arthritis, intestinal flatulence, and gastritis. Treated 8 weeks (11 tr.). Teeth firmer; little pus. Other symptoms slightly improved. (Discontinued treatment; had to leave town.)

(45) F. C. June 16, 1910. Female, 55 yrs. Gums markedly receded, boggy, tender, and inflamed; several teeth loose; pus in a few sockets. Staphylo. and diplo. on cultures. Rheumatism, articular and muscular. Treated 2 mo. (12 tr.). Teeth firm; gums look healthy. No recurrence, 24 mo. Rheumatism improved.

(46) H. S. C. Apr. 22, 1910. Female, 56 yrs. Gums receded, inflamed, and bleed easily; several teeth loose; pus in a few sockets. Staphylo., a few diplo. chains and bacilli on cultures. Rheumatism, general malaise. Treated 8 mo. (24 tr.). Teeth firm, recession checked; no pus. Other symptoms disappeared. No recurrence, 21 mo.

(47) R. F. D. Aug. 19, 1910. Male, 60 yrs. Physician. General recession and tenderness of gums; one tooth very loose, others slightly; pus in several sockets. Cultures showed pneumo. and staphylo. Muscular rheumatism. Treated irregularly for 8 weeks. Gums improved.

(48) A. M. D. Nov. 30, 1909. Female, 34 yrs. Gums markedly receded, tender, and bleed easily; two teeth very loose; pus in several sockets. Cultures showed staphylo., pneumo., and bacilli. Rheumatic pain in leg, intestinal flatulence. Treated 5 mo. (26 tr.). Teeth firmer; no pus; gums healthy. Other symptoms relieved.

(49) C. T. D. Apr. 13, 1911. Male, 55 yrs. Gums markedly receded, swollen, boggy, and inflamed; one tooth very loose, others slightly; pus in several sockets. Pneumo. in chains, staphylo. and strepto. on cultures. Rheumatism, gas in stomach and bowels. Treated 6 weeks (8 tr.). Gums markedly improved; teeth firmer; no pus. Feels well generally.

(50) C. J. D. Feb. 17, 1910. Male, 38 yrs. Gums receded, painful and bleed easily; several teeth loose; great deal of pus. Cultures showed pneumo. and strepto. Lupus erythematus, intestinal flatulence. Treated 5 mo. (28 tr.). Gums in healthy condition; no pus; teeth firmer. No

recurrence, 26 mo. Skin trouble improved; other symptoms relieved.

(51) J. D. Nov. 11, 1910. Male, 44 yrs. Gums very sore, bleed easily, boggy, swollen, and painful; all teeth loose; considerable pus surrounding each tooth, lost eight teeth from looseness. Pneumo. in chains, staphylo., and bacilli on cultures. Gastritis, chronic diarrhea, rheumatism. Gums too tender for instrumentation. After third injection gums sufficiently improved for local dental treatment. Treated with vaccine 3 mo. (13 tr.). Gums in healthy condition; teeth firm; no pus; comfortable on mastication. Other symptoms relieved. Has prophylactic treatment every 3 or 4 mo.

(52) A. E. Jan. 9, 1911. Female, 51 yrs. Gums markedly receded and inflamed; several teeth loose; little pus; lost one tooth from looseness. Cultures showed pneumo. in chains and macrococci. Atrophic arthritis, arthritis deformans of all joints, intestinal flatulence. Treated 5 mo. (33 tr.). Loose teeth firmer; gums look healthier; mouth feels better. Rheumatism slightly improved; other symptoms markedly improved.

(53) A. W. F. Apr. 22, 1909. Male, physician. Several teeth loose; marked recession, tenderness, and marked suppuration of gums. Cultures showed pneumo., staphylo., and a few strepto. Intestinal flatulence. Treated irregularly for several months (7 tr.). Gums felt better; less pus. (Felt comfortable. Too busy to attend to it.)

(54) M. F. Oct. 25, 1911. Male, 51 yrs. Gums receded and inflamed. Painful on mastication; two teeth very loose, two lost from looseness. Great deal of pus present. Cultures showed pneumo. and strepto. Gastritis, intestinal flatulence. Treated 5 weeks (6 tr.). Pus diminished; teeth firmer. (Felt comfortable. Discontinued treatment against advice.)

(55) A F. July 21, 1910. Female, 34 yrs. Gums receded and inflamed, bleed easily; one tooth very loose; little pus. Cultures showed staphylo. Purpura hemorrhagica of lower part of body, 2½ yrs'. duration. Treated 9 mo. (29 tr.). Gums healthy; tooth firm; no tenderness or bleeding. No recurrence, 15 mo. Purpura relieved by thyroid and diet.

(56) L. A. G. Mar. 31, 1910. Male, 50 yrs. General recession; all teeth loose; pus discharging freely from sockets. Cultures showed pneumo. and staphylo. Rheumatism, stomach distress, intestinal flatulence, and general malaise. Treated 10 weeks (12 tr.). Teeth firm; no pus; gums healthy. Other symptoms improved. No recurrence, 27 mo.

(57) H. G. . Apr. 23, 1910. Male, 28 yrs. Gums receded; two teeth very loose; pus in sockets of loose teeth. Cultures showed pneumo., staphylo., and bacilli. General malaise. Treated by family physician for 8 weeks. Very little improvement.

(58) A. F. G. July 8, 1910. Female, 35 yrs. All teeth loose, and profuse discharge of pus; lost three teeth from looseness. Pneumo. and staphylo. on cultures. Muscular rheumatism, chronic diarrhea, dyspepsia. Vaccines sent to her dentist to follow out treatment. No improvement.

(59) G. A. H. Mar. 6, 1912. Male, 37 yrs. Gums receded and inflamed, tender on mastication; lost two teeth from looseness, several teeth loose, pus present around them. Pneumo. and staphylo. on cultures. Chronic furunculosis, intestinal flatulence. Treated 5 weeks (6 tr.). Gums in healthy condition; no pus; teeth firm. Other symptoms relieved.

(60) A. S. H. Sept. 9, 1910. Male, 52 yrs. Gums receded, boggy, and tender; several teeth loose; one very loose; pus in sockets of loose teeth. Cultures showed pneumo., staphylo., and strepto. Rheumatism, continuous "colds," cough. Treated 2 mo. by his family physician. Gums healthy; very loose tooth tighter, others tight; no pus. Feeling well generally. No recurrence, 21 mo.

(61) Mar. 21, 1912. Male, 42 yrs. Two very loose teeth, discharging pus freely; lost fourteen teeth from looseness; marked general recession of gums. Staphylo. and pneumo. on cultures. Bad carbuncle on neck; diabetes. Treated 3 months (27 tr.), primarily for carbuncle. Gums improved; no pus; teeth firmer. Carbuncle cured.

(62) W. W. H. June 23, 1909. Male, 40 yrs. Very marked recession; four loose teeth; profuse pus; difficulty in chewing. Cultures showed pneumo., staphylo., and strepto. Intestinal flatulence, rheumatism. Treated 5 weeks (6 tr.). Gums improved; little pus; teeth firmer; no tenderness. Other symptoms relieved.

(63) F. E. H. Apr. 4, 1911. Male, 59 yrs. Gums receded and inflamed; three teeth loose; profuse pus. Cultures showed pneumo., staphylo., and macro. Chronic naso-pharyngitis, rheumatism. Treated by dentist. No report received.

(64) C. F. H. Oct. 1, 1910. Female, 50 yrs. Gums receded, tender on chewing, and bleed easily; one tooth very loose; pus. Cultures showed pneumo. and staphylo. Rheumatism, eczema, gas in stomach and bowels. Treated 2 mo. (8 tr.). Gums in healthy condition, tooth firm; no pus. No recurrence, 21 mo. Other symptoms relieved.

(65) H. H. Nov. 12, 1910. Female, 33 yrs. Acute general inflammation of gums. All teeth loose, profuse pus. Left lower third molar removed, socket curetted, and some necrotic bone removed, three weeks before she was brought to me by her physician. Wound slow in healing. Cultures showed diplo., staphylo., and long and short bacilli. Subacute pharyngitis and laryngitis. Treated 1 week (3 tr.). Marked improvement in gums; acute inflammation and suppuration subsided; wound healing rapidly; teeth firmer. Discontinued treatment. Seen 19 mo. later: Gums healthy. Feeling well generally.

(66) S. E. J. Jan. 10, 1910. Female, 30 yrs. Gums very markedly receded, painful, tender, and inflamed; four teeth lost from looseness, the rest remaining loose, two very loose; pus in many sockets. Cultures showed pneumo. Intestinal flatulence and chronic constipation.

Treated 6 mo. (18 tr.). Gums looked healthy; all teeth firm except the two that were very loose; no soreness or pus. Feeling "unusually well."

(67) P. A. J. Jan. 12, 1910. Male, 36 yrs. Marked recession; lost two teeth from looseness, four teeth loose, one very loose; profuse pus. Was advised to have very loose tooth removed. Pneumo. on cultures. Gas in stomach and bowels, severe headaches. Treated 5½ mo. (19 tr.). Gums in good condition; very loose tooth removed, others firm; no pus. No recurrence, 26 mo. Other symptoms relieved.

(68) J. T. J. Nov. 17, 1908. Female, 36 yrs. Gums receded, painful, and bleed easily; four teeth loose; pus in sockets of loose teeth. Cultures showed pneumo. and staphylo. aur. Rheumatism, colon cystitis. Treated 4 weeks (6 tr.). Teeth firmer; little pus present; gums felt comfortable. (Discontinued treatment.)

(69) M. A. K. Mar. 3, 1911. Female, 53 yrs. Marked recession and inflammation of gums; one tooth very loose, lost four teeth from looseness; considerable pus in socket of loose tooth. Cultures showed pneumo. and staphylo. Rheumatism, intestinal flatulence. Treated 4 mo. (9 tr.). Gums improved; tooth firmer. Other symptoms relieved. Seen a year later. Gums in healthy condition.

(70) C. A. L. Oct. 19, 1909. Female, 64 yrs. Gums receded and anemic; lost all upper teeth and eight lower, remaining teeth loose; profuse pus. Cultures showed pneumo. and a few bacilli. Gastro-intestinal disturbances, rheumatism, general debility. Treated 4 mo. (13 tr.). Gums markedly improved; teeth firm; very little pus present. Other symptoms relieved.

(71) W. S. L. Dec. 11, 1910. Female, 59 yrs. General recession; several teeth loose and pus around them. Cultures showed pneumo. Stomach and intestinal flatulence, rheumatism. Treated 1 week (2 tr.). Obliged to leave town. Gums felt better; little improvement as to pus and looseness.

(72) M. S. L. Feb. 24, 1911. Male, 52 yrs. Gums receded; lost one tooth from looseness, several teeth loose; profuse pus. Cultures showed staphylo., M. catarrhalis, and fusiform bacilli. Treated 2 weeks (3 tr.). Gums slightly improved; pus lessened. Felt comfortable. (Discontinued treatment against advice.)

(73) T. R. M. Aug. 19, 1909. Female, 36 yrs. Gums inflamed and boggy, receded in places; mastication painful, one tooth very loose; pus in socket. Cultures showed pneumo. in chains and M. catarrhalis. Rheumatism, constipation, intestinal flatulence. Very loose tooth removed. Treated 4 mo. (22 tr.). Gums in good condition. Felt well generally. No recurrence, 33 mo.

(74) A. J. M. Feb. 9, 1910. Female, 46 yrs. Gums receded, congested, bleed easily; one loose tooth: pus in socket. Cultures showed pneumo. in chains and a bacillus. Rheumatism, chronic constipation. Treated 10 weeks (9 tr.). Recession checked; no bleeding or tenderness; tooth firm. No recurrence, 28 mo. Other symptoms relieved.

(75) H. V. M. Jan. 12, 1911. Male, 48 yrs. Gums receded, tender on chewing; lost two teeth from looseness, all others loose. Pneumo. on cultures. Stomach and intestinal flatulence, general malaise. Treated irregularly for 6 mo. (15 tr.). Gums felt better. Other symptoms improved. (Too busy to continue treatment.)

(76) E. B. M. Jan. 17, 1910. Female, 38 yrs. Gums receded and tender; lost two teeth, all others loose; profuse pus. Cultures showed staphylo. and pneumo. Chronic naso-pharyngitis and laryngitis, intestinal fermentation. Treated 5 mo. (by family physician). Gums healthy; teeth firm. Other symptoms relieved.

(77) J. M. Feb. 24, 1912. Male, 44 yrs. Gums receded, boggy, and tender; three teeth loose; pus in sockets. Cultures showed pneumo. and staphylo. Chronic furunculosis, bronchitis, rheumatism, and intestinal flatulence. Treated 2 mo. (11 tr.). Gums in good condition; teeth firm; no pus. Feels comfortable. Other symptoms relieved.

(78) F. M. July 31, 1911. Female, 36 yrs. Gums very spongy, inflamed, and tender on chewing; one tooth very loose, four other teeth lost from looseness. Profuse pus. Cultures showed pneumo. and staphylo. Stomach and intestinal flatulence, headaches. Treated 4 mo. (14 tr.). Tooth firm; gums in healthy condition. No recurrence, 11 mo. Other symptoms relieved.

(79) C. H. M. Mar. 29, 1910. Male, 43 yrs. Gums markedly receded and inflamed; has difficulty in talking; three teeth very loose, had two of them removed; profuse pus. Cultures showed pneumo. and staphylo. Rheumatism, intestinal fermentation, eczema. Treated 8 mo. (28 tr.). Gums in good condition. Other symptoms relieved.

(80) C. M. Nov. 17, 1909. Female, 39 yrs. Gums receded, inflamed, boggy, and very sensitive; several teeth loose; pus in sockets. Cultures showed pneumo. and staphylo. Chronic bronchitis, postnasal catarrh. Treated 7 mo. (35 tr.). Gums look healthy; teeth tight. No recurrence, 28 mo. Other symptoms improved.

(81) F. M. Dec. 31, 1909. Female, 50 yrs. Gums markedly receded and inflamed, tender on chewing; one tooth very loose, others slightly; lost two teeth from looseness. Pus cultures showed pneumo. in chains and diplo. Rheumatism, gas in stomach and bowels. Treated 2 mo. Felt comfortable. Discontinued treatment against advice; returned later. Treated 4 mo. (19 tr. altogether). Gums healthy; tooth firm. Other symptoms relieved.

(82) R. N. Jan. 19, 1910. Male, 45 yrs. Gums receded, spongy, and painful on mastication; several teeth loose. Profuse pus from sockets. Cultures showed pneumo. Stomach and bowel distress, rheumatism. Treated 9 mo. (27 tr.). Gums in good condition; teeth firm. No recurrence, 22 mo. Other symptoms relieved.

(83) H. N. Feb. 8, 1912. Female, 47 yrs. Gums receded, sore, spongy; lost two teeth from looseness, all teeth slightly loose; little pus.

Cultures showed pneumo. and staphylo. Stomach distress and gas, articular rheumatism. Treated 5 mo. (15 tr.). Gums healthy; teeth firm; no pus. Other symptoms relieved.

(84) W. J. N. Mar. 12, 1911. Female, 50 yrs. Gums tender, receded, hoggy, and inflamed; three teeth very loose, all slightly, lost 6. Profuse pus. Cultures showed pneumo. Intestinal fermentation, hay fever. Treated 3 mo. (11 tr.). Gums markedly improved; teeth firmer; no pus. No recurrence. Was free from hay fever the following year.

(85) E. C. O. June 21, 1909. Female, 42 yrs. Gums sore, very boggy and inflamed; several teeth very loose; profuse pus. Cultures showed pneumo. and staphylo. Treated 3 mo. (18 tr.). Gums improved; little pus; no soreness; teeth firmer. (Discontinued treatment against advice.)

(86) S. L. P. May 29, 1911. Female, 64 yrs. Gums markedly receded; lost several teeth, several very loose now; profuse pus. Cultures showed pneumo. and yeast fungi. Chronic rheumatoid arthritis, intestinal fermentation. Treated 4 mo. by family physician. No apparent improvement.

(87) C. C. P. Mar. 19, 1912. Male, 52 yrs. Gums receded and spongy; all teeth affected and slightly loose; pus. Cultures showed pneumo. and staphylo. Had 1 treatment and dropped out. (Of value for cultural findings.)

(88) W. J. P. Jan. 27, 1911. Male, 40 yrs. Marked recession and inflammation of gums; several teeth loose; little pus present. Pneumo. and yeast fungi on cultures. Stomach and bowel distress, marked flatulence. Treated 2 weeks (2 tr.). Gums looked better. Felt comfortable. (Discontinued treatment.)

(89) M. P. Nov. 28, 1911. Male, 56 yrs., physician. Very marked recession; all teeth loose; acute abscess formation and inflammation; profuse pus. Cultures showed strepto., pneumo., and staphylo. Stomach and bowel distress. Marked gas formation. Treated 5 mo. (16 tr.). Gums markedly improved; no pus; teeth firmer. Other symptoms improved.

(90) G. A. R. Nov. 1, 1911. Male, 49 yrs. Gums receded and inflamed; lost four teeth from looseness; little pus. Cultures showed staphylo. and pneumo. Stomach and intestinal distress, neuralgic pains of face, general malaise. Treated 2 mo. (6 tr.). Marked improvement of gums. Other symptoms relieved.

(91) D. P. R. Sept. 29, 1910. Male, 34 yrs. Gums markedly receded and boggy; difficulty in chewing; all teeth loose. Pus cultures showed pneumo. and staphylo. Psoriasis, marked intestinal flatulence. (Had 1 treatment; objected to diet. Discontinued treatment.)

(92) J. C. R. Jan. 12, 1910. Male, 43 yrs. Gums swollen, sore; two teeth loose, lost one from looseness. Profuse pus. Cultures showed pneumo. Diabetes, indigestion, general debility. Treated with vaccine by dentist for 6 months. Gums healthy; no tenderness; teeth firm; no pus. Other symptoms relieved. No recurrence, 26 mo.

(93) G. W. R. Dec. 15, 1911. Male, 41 yrs. Gums very receded and inflamed; six teeth very loose, lost three from looseness; pus in one socket. Cultures showed pneumo. and staphylo. Stomach and intestinal flatulence, general malaise. Treated 3 mo. (12 tr.). Gums healthy; teeth firm; no pus. Other symptoms relieved.

(94) S. J. R. Dec. 2, 1909. Female, 43 yrs. Gums tender and receded; lost several teeth from looseness, all teeth affected, two very loose; profuse pus. Cultures showed pneumo. and staphylo. Rheumatism, stomach and intestinal disturbances. Treated 3 weeks (5 tr.). Gums improved; less pus; teeth firmer. General condition better. (Left town.)

(95) D. P. R. June 24, 1910. Male, 41 yrs. Gums very sore and receded; three teeth loose; pus. Cultures showed pneumo. and staphylo. Chronic sore throat. Treated 5 mo. (20 tr.). "Gums fine." Teeth firm. No recurrence, 21 mo. Other symptoms improved.

(96) F. R. R. June 5, 1911. Male, 57 yrs. Gums receded and tender on chewing; teeth slightly loose; little pus. Pneumo. and staphylo. on cultures. Stomach and intestinal flatulence, constipation. Treated 5 mo. (13 tr.). Gums healthy; teeth firm. No recurrence, 9 mo. Other symptoms relieved.

(97) A. W. R. Jan. 26, 1910. Male, 61 yrs. Gums receded, boggy; lost all teeth but six, those present loose; profuse pus in sockets; artificial dentures troublesome. Cultures showed pneumo. and staphylo. Chronic rheumatism, fistula in ano for thirty years with strepto. infection (operated upon three times unsuccessfully). Treated 2 mo. (7 tr. with autogenous gum and autogenous strepto. vaccine from fistula). Gums improved; teeth firmer; no pus. Fistula operated upon successfully by Dr. T. C. Hill. Other symptoms relieved. No recurrence, 29 mo.

(98) C. H. R. Dec. 19, 1911. Female, 37 yrs. Gums spongy and receded, fifteen years' duration; teeth sore, several loose teeth now; lost four teeth; pus in sockets. Cultures showed pneumo. and staphylo. General debility, stomach and intestinal disturbances. Treated 1 mo. (5 tr.). Gums not sore; look healthy; no pus. "Feeling fine." No recurrence, 8 mo. (Serumal deposits on roots would cause an acute purulent inflammation with unbearable pain. Teeth would loosen rapidly and have to be removed. No salivary deposits. Lost four teeth that way.)

(99) M. F. S. Oct. 19, 1909. Female, 59 yrs. General recession; several loose teeth, two very loose. Profuse pus. Cultures showed pneumo. in chains and diplo. forms. Rheumatoid arthritis with severe pain in muscles and joints, stomach and bowel distress. Treated 8 mo. (33 tr.). One very loose tooth removed. Gums in good condition; other teeth firm. Arthritis previously treated unsuccessfully by able orthopedic surgeon cured while under vaccine treatment for gums. Other symptoms relieved. No recurrence, 28 mo.

(100) L. T. S. Jan. 28, 1910. Female, 34 yrs. Gums very spongy and painful; lost six teeth from looseness, all remaining teeth loose; submaxillary gland swollen; pus. Pneumo. and staphylo. on cultures. Urticaria, indigestion,

chronic constipation. Treated 4 mo. regularly and 8 mo. irregularly (38 tr.). Gums in good condition; teeth firmer; swollen gland normal. Feeling well otherwise.

(101) R. S. Sept. 9, 1910. Female, 37 yrs. Gums boggy and receded; several teeth loose; pus. Cultures showed pneumo. Rheumatism, indigestion, stomach distress. (Had 1 treatment. Dropped out.)

(102) K. J. S. Apr. 14, 1912. Female, 42 yrs. Gums boggy and receded in places; several teeth loose; pus. Cultures showed staphylo., pneumo., and spirilli. Rheumatism, intestinal flatulence, chronic urticaria. Treated 1 mo. (3 tr.). Pus diminished; teeth firmer. Other symptoms improved. Felt comfortable. (Discontinued treatment.)

(103) W. H. S. Apr. 4, 1912. Female, 60 yrs. Gums receded, bleed easily; several teeth loose, lost five from looseness; pus. Cultures showed pneumo. and staphylo. Stomach and intestinal flatulence, general malaise. Treated 10 days (3 tr.). Gums improved; teeth firmer; little pus. Comfortable generally. (Obliged to leave town. Discontinued treatment.)

(104) J. H. S. Feb. 28, 1911. Male, 53 yrs. Gums markedly receded; one tooth very loose, all others slightly, had lost three; pus. Cultures showed pneumo., strepto., and staphylo. Marked intestinal fermentatiou. Treated with vaccine by dentist for 6 weeks: Gums in good condition; teeth firm. Other symptoms relieved.

(105) M. S. Mar. 30, 1909. Male, 40 yrs. Gums receded and very painful on mastication; two teeth very loose, dentist advised removal; pus in sockets of loose teeth. Cultures showed pneumo. and staphylo. Intestinal flatulence, severe headaches (neuralgic?) Treated 5 mo. (25 tr.). Gums healthy; teeth firm; no pus. Other symptoms relieved. No recurrence, 36 mo.

(106) F. M. S. Sept. 28, 1910. Female, 49 yrs. Gums markedly receded, spongy, and inflamed; three teeth very loose, all others affected, lost two teeth from looseness; profuse pus. Cultures showed pneumo. and staphylo. Rheumatism, indigestion, gas, constipation, eczema. Treated 7 mo. (22 tr.). Gums in good condition; teeth firmer; no pus. Other symptoms relieved. No recurrence, 15 mo.

(107) G. S. Jan. 22, 1910. Female, 50 yrs. Gums painful, receded (fifteen years' duration); six teeth loose, lost five others from looseness; pus in sockets. Cultures showed pneumo. and staphylo. Rheumatism, intestinal fermentation. Treated 2 mo. (12 tr.). Gums markedly improved; all but very loose tooth firm. Comfortable on chewing. Other symptoms improved.

(108) W. P. S. June 8, 1911. Male, 52 yrs. Gums receded and very tender, spongy; lost six molars from looseness, all other teeth loose; difficulty in talking and chewing; profuse pus. Cultures showed pneumo., strepto., and staphylo., and many long bacilli. Rheumatism, stomach and intestinal flatulence. Treated 8 mo. (27 tr.). Gums fine in color and firm; no pus, no bleeding or tenderness; teeth firm. Feeling well generally. Seen one year later: Gums still in good condition.

(109) A. B. S. Aug. 16, 1910. Female, 41 yrs. Gums receded, boggy, and painful, bleed easily; several teeth loose, lost two from looseness; pus in sockets of loose teeth. Cultures showed pneumo. in chains and staphylo. Rheumatism, dermatitis exfoliativa. Treated 3 mo. (14 tr.). Gums in good condition; teeth firm. No recurrence, 22 mo. Other symptoms improved.

(110) L. S. Sept. 8, 1910. Female, 35 yrs. Gums receded and inflamed (fifteen years' duration); lost five teeth from looseness, three teeth very loose, all others loose; pus in sockets. Cultures showed pneumo. in chains, staphylo., and macrococci. Rheumatism. Treated 4 mo. (16 tr.). Gums in good coudition; two teeth still slightly loose, all others firm. No recurrence, 21 mo. Other symptoms relieved.

(111) G. N. T. June 4, 1911. Female, 45 yrs. Gums very spongy, bleed profusely; teeth slightly loose; pus in several sockets. Cultures showed pneumo. and mucosus capsulatus. Rheumatism, intestinal fermentation, general malaise. Treated 7 mo. (26 tr.). Gums in good condition; teeth firm; no pus; no bleeding. Other symptoms relieved.

(112) C. A. V. Jan. 23, 1911. Male, 72 yrs. Gums anemic, flabby, and markedly receded; three teeth loose, lost several from looseness; pus in sockets of loose teeth. Cultures showed pneumo. Rheumatism, intestinal fermentation. Treated 2 mo. (2 tr.). Gums well; teeth firm. Other symptoms relieved. No recurrence, 18 mo.

(113) L. W. Oct. 22, 1911. Female, 45 yrs. Gums spongy, sore, and markedly receded; teeth slightly loose; pus in sockets of loose teeth. Cultures showed pneumo. and staphylo. Severe backache, walking very painful, chronic constipation. Treated 2 mo. (6 tr.). Gums improved; teeth firmer; no bleeding or pain. Pain in back remained about the same.

(114) F. B. W. Oct. 12, 1911. Male, 49 yrs. Gums receded, bleed easily; difficulty in chewing; several teeth loose, lost two teeth from looseuess; pus in sockets of loose teeth. Cultures showed pneumo. and staphylo. Rheumatism, stomach and intestinal fermentation. Treated 2 mo. (7 tr.). Gums improved; teeth firmer; no pus. Felt generally well.

(115) F. H. W. Mar. 2, 1911. Female, 42 yrs. Gums markedly receded, sore, and bleed easily; one tooth very loose, nearly all others slightly; pus present around loose tooth. Cultures showed pneumo., staphylo., and some macrococci. Rheumatism, stomach and intestinal distress, periodic headaches. Treated 3 mo. (9 tr.). Gums looked healthy; no pus; teeth firm. No recurrence, 15 mo. Other symptoms improved

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[The discussion of Dr. Medalia's paper, jointly with that of Dr. Harris, will be found at page 182.]

The next paper was one by Dr. GEORGE B. HARRIS, Detroit, Mich., entitled "The Treatment of Pyorrhea by Bacterial Vaccines, and the Results of Animal Experimentation," as follows:

The Treatment of Pyorrhea by Bacterial Vaccines, and the Results of Animal Experimentation.

By GEORGE B. HARRIS, Sc.M., D.D.S., Detroit, Mich.

THE predisposing causes of pyorrhea have been laid to many conditions, the formation of calcarious deposits on the teeth being generally considered the chief of these. The fact that these calcium salts produce a local irritation, however, is no proof that their effects are local; nor is the fact that they are precipitated from the saliva any proof that they originated there. A su-

perabundance of these salts in the saliva is the direct result of faulty metabolism, and is entirely preventable by the use of Epsom salts. If you doubt that, try it. The fact that pyorrhea entirely clears up after the teeth have been extracted is sometimes considered ample proof that it is purely local in all its phases. Certainly it clears up, but pyorrhea is not cured by removing the tissues involved. What is done is simply the bringing about of certain conditions which later would follow the ravages of pyorrhea. The underlying, predisposing causes still remain. Appendicitis can be cured by removing the appendix, but certainly the appendix is not cured by its removal. Neither does the removal of the appendix, followed by recovery from the attack of appendicitis, prove that the disorder was entirely local in effect, cause, and conditions. I am not attempting to belittle the local treatment for pyorrhea in any way, shape, or form. Local treatment is of vital importance in the treatment of this disease, but we have to get back of the effect of pyorrhea and attack it at its starting-point, if we hope to check and cure it in its later stages. The removal of calcarious deposits is of vital importance, and the gums must be kept from coming in contact with them at all times. Unless this is done, the gums cannot resume a healthy condition, and our best efforts in any other direction will be wasted. But while we are busily engaged in scaling the teeth and applying this or that mouth-wash, we must not lose sight of the fact that pyorrhea is an *infectious* disease, that the infection is generally located at a point which antiseptics cannot possibly reach, and that the entire removal of infectious material is impossible. Even if the removal of all infected tissue were practicable, pyorrhea would recur at once, if indeed it was ever cured. Time will not permit me to point out why this is so, but those interested may be referred to an article published in *Items of Interest*, entitled "Some Phases of Pyorrhea Alveolaris and Its Treatment by Bacterial Vaccines."* When tetanus follows an injury produced by a rusty nail, it might be considered to be of local origin. Tetanus cannot be cured, however, by treating the point of ingress of the tetanus bacillus. Just as tetanus is very plainly more than local in its effect, so pyorrhea certainly has a more far-reaching effect than a purely local one, regardless of the fact that we are a little slow to apprehend its true significance.

Can pyorrhea be cured by local treatment alone? I would answer that question by saying, That depends entirely on what one chooses to call pyorrhea. If a simple irritation surrounding the gums is to be considered as pyorrhea, or ulcers forming on the gums be pyorrhea, then I would say that those forms of the disease—if they are such—can be cured by local treatment. I do not choose to call these conditions pyorrhea, however.

By pyorrhea, I mean an infection of the alveolus producing pus; and these cases, I contend, cannot be cured by local treatment alone. To illustrate: Mr. C. was referred to me as suffering with pyorrhea. Upon examination I found that his gums were in a very bad condition, the upper one being simply one mass of ulcers. This case was cured by two applications of a 20 per cent. solution of silver nitrate—viz, cured by local treatment. That was not a case

* See *Items of Interest* for February 1912, vol. xxxiv, p. 122.

of pyorrhea, however, although it might have developed that disease later, or the patient may contract it at some later date; but he did not have it at that time. If his resistive powers should be raised, however, he would be in absolutely no danger of contracting it. The resistive powers to infection can be raised by vaccines, which prevent as well as overcome infection. Supposing an infection of the gums has been overcome by local treatment; what has been done to prevent another infection? By what means have the predisposing causes been altered in any way, so that reinfection will not bring about the same condition?

NEGLIGIBLE VALUE OF ANTISEPTICS.

Local treatment is important, but local treatment alone cannot remove infection or prevent it. Oral prophylaxis will do a great deal, and antiseptics may help a little, but if one pins his faith to antiseptics, he will be disappointed, because no antiseptic can be used strong enough or long enough to have any effect on the bacteria. The antiseptics generally used, if the truth be known, when they are diluted—as they have to be before they can be used in the oral cavity—hardly have an inhibitory action, let alone any antiseptic powers. The term antiseptic is the most abused term in all dental nomenclature. When it is applied to a mouth-wash, the idea is conveyed of a little boric or other acid, dissolved in water and alcohol, nicely colored and flavored, such a mouth-wash being supposed to give an alkaline reaction, though it seldom does. To this exceedingly useless concoction is added an astringent to make the mouth feel nice and cool—for a few minutes. Such substances as these are heralded by the manufacturers as preventives, cures, valuable adjuncts, etc., in pyorrhea. The manufacturers depend upon the color, taste, and the ignorance of the dentists for their sale. I do not say that all of these preparations are useless. I will say, however, that some are harmful, as every practitioner may test for himself.

PROBLEMATIC VALUE OF ORAL PROPHYLAXIS.

Oral prophylaxis will do a great deal of good if properly carried on by the patient. We are lucky, however, if we can get the patient to brush his teeth twice daily, in any old way. If he did practice oral prophylaxis as it should be done, reinfection would not be made anything like an impossibility. Indeed, the improper use of the tooth-brush plays an important part in the initial infection, as well as in its recurrence. Oral prophylaxis, then, lessens the danger of reinfection, but does not remove it. A high index toward the organisms with which the tissues are sure to come in contact is the only safe way to prevent a reinfection. Vaccines will do this.

EXPERIMENTAL PYORRHEA IN GUINEA-PIGS.

When the staphylococcus is introduced directly into the gums of a guinea-pig, one of two things will happen. Either the infection, instead of remaining local, will rapidly become general, resulting in the death of the pig, or else the infection is promptly checked and overcome by the leucocytes in the blood. Which of these two processes will happen depends upon the number of bacteria in-

jected and upon the resistive powers of the pig, and this depends directly upon the power of the leucocytes to ingest the bacteria. The same process takes place in the oral cavity; either the resistive force is high enough to ward off the attack, or else an infection follows. The resistive powers in man, however, seldom reach an ebb so low that the staphylococcus is able to produce a general infection, as it often does in guinea-pigs. The best method of producing pyorrhea in a guinea-pig is an indirect one, preferably by means of a putrescent canal. Having produced a putrescent canal with staphylococcus infection, an irritation is produced by means of cement under the gums, preferably in the region of the infected canal, and pyorrhea will develop. It will develop far more rapidly, however, if the pig is constipated, and more quickly in old pigs than in younger ones, although it is possible to cultivate pronounced cases at any age. It is very difficult to produce pyorrhea in the guinea-pig by introducing the bacteria directly into the gums. I would not say that it is impossible to do so, but I have not succeeded in producing the disease in that way. The susceptibility of guinea-pigs to bacteria is the reason why this becomes so difficult, and experiments usually result in a general infection and the death of the pig.

EXPERIMENTS WITH VIRULENT AND ATTENUATED FORMS OF STAPHYLOCOCCUS ALBUS AND AUREUS.

At the meeting of the Northern Ohio Dental Association I made the statement that I did not believe pyorrhea to be caused by true albus or aureus, but rather by an attenuated form of these. and possibly other organisms. My belief is stronger today than it was then. Cultures obtained from acute abscesses and cases of true pyorrhea were incubated at the same time; clusters of each were then put in separate test tubes containing sterile water. They were then counted and diluted until each contained one million bacteria to the cubic centimeter. One-half of 1 cc. from one tube was then injected into a guinea-pig, and the same amount from the other tube into another pig of the same weight. The pig that received the injection from the tube containing the bacteria obtained from the abscess died twenty-four hours before the other. Repeated experiments gave the same result; the virulence of the one was found to be nearly one-third greater than that of the other. There is also a difference in the growth of the two strains: (1) The one is more rapid in growth, (2) it resists various antiseptic agents longer, and (3) cultures obtained from true cases of pyorrhea are much more difficult to separate from the agar, and it is more difficult to break up the clusters in the centrifugal machine.

COMPARATIVE RESULTS OF STOCK AND AUTOGENOUS VACCINES, AND LOCAL TREATMENT EMPLOYED IN EXPERIMENTAL ANIMALS.

Various means were employed in treating the guinea-pigs suffering from pyorrhea, which was produced in them in the manner described above. Stock vaccines were employed in some cases, while autogenous vaccines were used in others; in still others local treatment only was tried. Where local treatment was used, improvement seemed to take place slowly, but as soon as the treat-

ment was discontinued, the condition became worse than it was before, leaving a larger area of involved tissue, which became reinfected at once. The extraction of the root only prevented the area from becoming infected so quickly. Although every effort was made to remove all infection, I do not believe this was accomplished, nor do I believe that it is possible to do so. The amount of pus produced soon became much greater than it had been formerly. When stock vaccines were used in conjunction with local treatment, the results varied. If a pure strain had been used in producing pyorrhea, a stock vaccine for that strain would break up the infection at once. If the infection was a mixed one, the result depended upon the luck I had in guessing the strains and the proportion of each.

TRANSMITTED INFECTION AND IMMUNITY BY VACCINES IN EXPERIMENTAL ANIMALS.

Four other guinea-pigs were infected, two with pure strains of albus, and two with pure aureus cultures. One infected with each organism was isolated; the other two were allowed to be together. Three weeks later an examination was made which showed that the two that were isolated were still infected with the same pure cultures, while the other two each showed mixed infection of the two, the original infection predominating in each case. Pigs not infected were then put with each of these. In every case they slowly became infected from their fellows. Still others, previously injected with vaccine, were put with the infected guinea-pigs, with the result that they showed immunity. In those cases where autogenous vaccines were employed, uniformly good results followed.

ADVANTAGES OF AUTOGENOUS VACCINES.

One strain may be the real cause of pyorrhea, and yet a pure strain vaccine will not produce the results expected. This is best explained by Dr. Schafer of California. He believes all acute and most chronic infections to be mixed infections. "While one species may predominate," he says, "the pathological process produced by it is intensified by other organisms, and while their numbers are either so comparatively small or their pathogenic rôle is insignificant in themselves, yet when brought in contact with other organisms whose pathogenic powers are much greater, they must be reckoned with in any successful scheme of therapeutics." In using the autogenous vaccines all the organisms playing this minor rôle which Dr. Schafer speaks of are made to play their corresponding part in producing beneficial results, which are obtainable in no other way.

CONCLUSION.

In conclusion, as a result of these and other experiments, I would say that—

(1) Pyorrhea is not a purely local condition, although it may be caused by local means.

(2) There are many predisposing causes, as

(*a*) Malnutrition producing constipation and faulty metabolism; (*b*) poor circulation of the alveolar tissue due to astringent mouth-washes and nervous disorders. These conditions cause malnutrition of the alveolar tissue, lowering greatly the force of resistance to invading bacteria.

(3) Pyorrhea may be caused by purely local conditions, as

(*a*) Putrescent canals, (*b*) alveolar abscesses, or (*c*) poorly fitting crowns. Any local condition producing an irritation of the alveolar tissue may so weaken the resistive force that infection becomes possible.

(4) Pyorrhea produces constitutional disorders that are far-reaching in effect, and may be the indirect cause of death.

(5) Pyorrhea is infectious.

(6) The resistive power of the leucocytes to invading bacteria is the main determining factor.

(7) Pyorrheal infection becomes impossible when the force of resistance to the involved bacteria is raised to a high point.

Discussion of the papers of Dr. Medalia and Dr. Harris.

Dr. G. D. Laymon, Indianapolis, Ind. I wish to congratulate the essayists upon their most excellent papers. Each of them has thoroughly covered his subject. From practical experience, I know some of the possibilities of vaccine therapy, which I have employed for almost three years in the treatment of dental diseases.

Vaccine therapy has had a great struggle, like every other great issue, but justice and right must prevail. The victory is being won, the curtain of ignorance, prejudice, narrowness, and personal selfishness is being cast aside, and the truth is being laid bare. While I believe that vaccine therapy is still in its infancy, yet sufficient proofs of its merits as a therapeutic agent have been furnished to warrant its judicious use.

Vaccine therapy is not a new mode of treatment, as the principles involved have been applied to disease for centuries. It has gradually grown with the development of bacteriology. Before the application of bacterial vaccines as a therapeutic agent in the treatment of disease, bacteriology was of little or no use to the surgeon. The procedure was just the same, regardless of the kind of organisms present. The mode of treatment was designated by symptoms, and not by bacteriological examinations.

Vaccine therapy has done more than all else in medicine to make it an exact science. Every year the field of application broadens; its possibilities are unlimited. Pasteur said: "It is possible to eradicate every infectious disease from the face of the earth." Since the marvelous development of vaccine therapy this statement is being realized; there is much yet to learn, but the horizon is gradually being cleared of fear and ignorance.

I am certainly glad to see the dental profession entering this field of experimental medicine. Dentists have come into disrepute in the minds of many intelligent persons simply because they were able to do but little for the common diseases of the mouth, such as pyorrhea alveolaris. I believe that vaccine therapy affords us one of the most powerful weapons with which to combat this dreaded disease.

The study of nature's immunizing apparatus teaches us how to take advantage of this process and produce artificial immunity by the use of immune sera or vaccines. When an immune serum is used, we inject under the skin a highly immunized serum, which contains immune substances to aid the individual in overcoming infection. This is known as a passive artificial immunity. When a vaccine is employed, we inject beneath the skin the dead carcases of previously sterilized pathogenic

bacteria suspended in a normal salt solution. The immunity thus produced is known as an active artificial immunity.

A great stride was made when an antidiphtheria serum was introduced as a therapeutic agent in the treatment of diphtheria. Investigation with immune serum in other infections has not as yet yielded satisfactory results. The attention and endeavor of investigators have therefore been turned toward the channel of active immunization. Now we possess a vaccine for a great number of infections.

At first, it was thought that a specific organism was necessary in order to combat disease by this method. Early investigations were made mostly with smallpox and tuberculosis; these diseases were treated by a specific organism, and brilliant results have been reported.

It is best to use a specific vaccine in the treatment of disease where a specific micro-organism can be demonstrated. However, there are a great many infections in which a specific organism has not been demonstrated, some of which are furunculosis, carbunculosis, abscesses, infected wounds, empyema of the chest, antrum, etc., middle-ear disease, pharyngitis, bronchitis, tonsillitis, appendicitis, white swelling, scrofula, some cases of consumption, and chronic alveolar osteomyelitis.

The principal organisms of these infections belong either to the staphylococcus or streptococcus group, and these infections may be combated successfully with an autogenous vaccine composed of these organisms. This statement is true, according to the reports of medical men.

Pyorrhea alveolaris to my mind is caused chiefly by the staphylococcus, this being the principal organism found in almost every case.

My investigations have been directed not so much toward the isolation of a specific organism in this infection, as to the employment of certain vaccines in its treatment. While I am certain that there are a great many bacteria present in pyorrhea cases, I believe that the majority of them are merely harmless saprophytes. The same pus-producing organisms are found in pyorrhea cases as you will find in suppurating lesions in other parts of the body.

The mouth is rendered immune principally by the process of phagocytosis. However, there are two other factors which are active in producing this immunity.

The normal functional activity of the mouth causes desquamation of the epithelial cells with adherent bacteria, and these are destroyed by the gastric juice. The epithelial cells of the oral cavity are constantly being replaced, this desquamation being especially active during active mastication. Although the epithelial cells do not possess phagocytic properties, nevertheless they are lined on the surface and also to a certain extent penetrated by scattered bacteria. The result is that the cells are dislodged by the saliva, and carried away to the stomach to be destroyed.

Another factor to be considered in connection with the immunity of the oral cavity to infection may be antagonism of organisms to one another, the organisms not common to the mouth succumbing to those normally present.

The experiment carried out by Miller on himself throws light on this question. He thoroughly rinsed his mouth with a bouillon culture of bacillus prodigiosus containing over 2,000,000,000 bacilli. The number of bacilli in a loop of his saliva was ascertained at the beginning of the experiment. His mouth at the end of three hours was practically free from the organisms.*

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* Quoted from J. F. Colyer, "Dental Surgery and Pathology," page 674.

The treatment of pyorrhea by vaccine therapy does not interfere in the least with other modes of treatment. Vaccines are not a panacea for mouth infections, but, if used judiciously, they will prove to be an invaluable aid in the treatment of pyorrhea cases.

In regard to animal experimentation, I have had very little personal experience, but wish to give some reports of prominent investigators.

Geo. T. Carpenter, in a paper read before the American Medical Association, mentioned some very interesting experiments. By infecting a fresh wound in the gums of rabbits with pyorrhea and other pus, he found the parts would remain infected only from two to five days. In other rabbits, a rubber band was placed around the teeth and pressed under the gums until an inflammation resulted. When the parts were infected with pyorrhea and the pus from a chronic ulcer, a pus infection resulted. Like experiments were made in the human mouth on gums which had been neglected, as well as on healthy gums, with similar results. These experiments tend to show that, when animals and man are healthy, the tissues resist infection, but when they are diseased, infection results.

Eugene S. Talbot has carried on a number of experiments in dogs. A dog was provided from a veterinary hospital whose gums and outer alveolar process were almost entirely absorbed, with pus exudate. Forty-six street dogs were selected for inoculation. They were of all breeds and conditions; some were well fed, others very thin. No dog was used whose gums and alveolar process had become infected, or whose tissues were absorbed. Thirty-nine cases which were inoculated by pyorrhea pus healed in eight days. In these, the gum tissues were healthy. The pus had no effect, and the wounds healed as rapidly as any wounds possibly could. In seven, the gums were inflamed, and infection occurred. Suppuration was slight in four, and considerable in three.

The pathogenic findings in these cases were not unlike inflammation and infection in other tissues. All experiments point to the fact that no one organism is responsible for pyorrhea, but, as I have said before, this infection is due to the common pus-producing organisms found in other suppurative lesions of the body.

I have made a microscopical examination of a great number of pyorrhea cases. Slides were smeared with the pus taken from the pus pockets and stained with Jenner's blood stain. Cultures were made by inoculating nutrient agar-agar and glycerin agar-agar. This was accomplished in the following manner: The mouth was sprayed with a mild antiseptic. A suitable pus pocket was selected, preferably on the upper gum, because this portion is freest from saliva. The pus pockets were washed out with sterile warm water, then massaged so as to get pus from the deepest portion. With a previously sterilized platinum loop wire, a small portion of pus was obtained and smeared over the surface of the culture media previously mentioned. These cultures were incubated until a sufficient growth was obtained to be plated; isolation was then made in the ordinary way. These organisms were carefully examined culturally and microscopically. I wish to report the following results, mentioning only the pathogenic organisms: Micrococcus catarrhalis, found in ten cases; streptococcus brevis, found in twenty cases; strepto-

coccus longus, found in fifteen cases; staphylococcus aureus, found in five cases; staphylococcus albus, found in every case; pneumococcus, found in twelve cases; bacillus fusiformis, invariably present.

As you see, the bacteriology of pyorrhea is not confined to any one group of bacteria, yet my experience has been that the principal pathogenic organism present belongs to the staphylococcus family, either the albus or a modification of the aureus and albus. These organisms give a characteristic growth upon nutrient agar-agar, having the appearance of a number of small beads. The cell wall is very tough, and the clumps are very difficult to emulsify. The cultural characteristics are very much unlike the growth of staphylococcus taken from other suppurative lesions of the body. I feel that we could safely name this organism staphylococcus pyogenes pyorrhea. I have treated over one hundred and fifty cases of pyorrhea by vaccine therapy—all with autogenous vaccine. The results have been invariably positive, so much so as to warrant the use of vaccine in dentistry.

I believe that vaccine therapy is not practical for the general practitioner, but belongs to the specialist, just as much as orthodontia, extracting, or anesthesia. I am certain that results are being obtained in pyorrhea by men in our profession who are not practicing vaccine therapy, as is shown by their many reports, but surely the course of treatment of this disease can be greatly shortened, and immunity greatly prolonged, by the judicious employment of an autogenous vaccine. This treatment should, however, be administered only by a thoroughly qualified operator.

I wish to add a few remarks concerning the dangers of the improper use of vaccine. When Koch announced his discovery of the tubercle bacillus, and tuberculin was placed upon the market as a therapeutic agent to be used in the treatment of tuberculosis, a great many physicians went wild over the possibilities of this agent. Dr. X knew of a patient who was suffering from tuberculosis, and he immediately decided to give Mrs. Jones an injection of tuberculin, without knowing the dangers of its improper use. The early administration of tuberculin by ignorant and inexperienced physicians did more harm than good. The result was that the use of tuberculin came into disrepute, and its employment for a time was discarded. Its use is being revived, however, and with a broader knowledge of its application in connection with autogenous vaccines. It has been found to be best to treat such cases first with an autogenous vaccine composed of the common pus-producing organisms, thus producing an immunity against these bacteria, and then follow this treatment with tuberculin. By the employment of such methods, vaccine therapy has been given a new life.

The fear of the use of vaccine in dentistry may be attributed, I think, to a lack of training in this particular field. Vaccine therapy has been given a black-eye, owing to the same experiences which I have previously mentioned in connection with tuberculin. The proper administration of vaccines is no more to be dreaded than the use of many drugs found in our materia medica.

Incidentally I may say that there are two kinds of vaccines, stock vaccines and autogenous vaccines.

Stock vaccines are prepared and placed upon the market by certain drug manu-

facturers. These vaccines are composed of sterilized bacteria which have been artificially cultivated, and are kept by constant replantation and inoculation of different culture media.

Autogenous vaccines are made from the pus taken directly from each individual case to be treated.

The relative value of these vaccines is apparent. Autogenous vaccines contain the organism or organisms in their respective number and virulence. This is a decided advantage, owing to the fact that, in one case, a certain organism may cause swelling, inflammation, and purulency, while the same organism microscopically and culturally in another case may not even be noticed. In one infection the staphylococcus aureus, in another the staphylococcus albus, may be the predominating organism.

Stock vaccines do not presuppose any definite knowledge of their manufacture —anyone using them depends upon the directions printed upon the label. In my opinion, an operator would be far more competent to employ vaccine therapy if he prepared his own vaccine. There is no excuse for the employment of stock vaccines in the treatment of diseases which are met by dentists.

Dr. M. C. Smith, Lynn, Mass. My experience with vaccines extends over a period of three and a half years, during which my results have been so uniformly successful that I am more thoroughly convinced today of the benefits to be derived from vaccines than ever before.

My experience has been a little different from that of Dr. Laymon, and the more I use vaccines the more I am in favor of stock vaccines. In my opinion we can depend on good stock vaccines made by reliable manufacturers. In some cases, however, I prefer the autogenous vaccines, when I have time to have the vaccines made without endangering the patient.

The question of the use of vaccines in dentistry seems to me a quite important one, since we have a very wide field for their application outside of pyorrhea. I would use vaccines in cases of necrosis of the facial bones, as the beneficial results are very marked. In comminuted fractures of the face or jaws, even before washing out the cavity of the mouth, I invariably administer a large dose of vaccine. I generally use stock vaccines in these cases, giving five minims of pneumococci and two of streptococci vaccines. I depend more on the pneumococci than any other. If the patient is doing well, I may wait four days, and then make another administration. Cervical adenitis is another disease in which markedly good results can be obtained with vaccines. In cases of alveolar abscess extending under the superficial fascia of the neck and discharging a very foul-smelling pus, it is surprising what one or two injections of vaccines will do in cleaning out and drying up the abscess. In all cases with a marked discharge of pus I would advise the use of vaccines. If upon examination of the urine, a large amount of sugar is found, the patient has to be deprived of the ordinary foods and placed on a strict diet. For a time such patients may get on nicely, but then have a relapse, from no apparent cause. I had a case of this kind not long ago, and after a close examination of the systemic condition of the patient, I found that he was not getting sufficient nourishment because he had been forbidden to take carbohydrate foods. As soon as he began to feel better, he began to overwork himself. The systemic condition

of the patient, therefore, must be closely watched while giving vaccine treatment.

Dr. T. B. Hartzell, Minneapolis, Minn. I am very greatly interested in Dr. Medalia's work, which I have been observing for some years by reading his results in various journals, and endeavoring to correlate his work with my experiences in my own special field.

I do not wish to discuss vaccine therapy, but will say that the estimation of the opsonic index is falling into disuse here in the United States, because it is possible to get any sort of an index, if one counts often enough. The Germans, especially, no longer depend upon it. This means that the men who first began to estimate the opsonic index in order to determine the relative value or importance of bacteria found in certain pathological conditions have given up this method, which is no longer being used to the same extent as it was two years ago, although it may be of great value.

In regard to the use of vaccines in cases of pyorrhea or other mouth infections, a search of the literature shows that there are almost as many different opinions about bacterial vaccines for oral cases as there are writers. Dr. Leary, with whom Dr. Medalia was associated for a time, in the *Dental Cosmos* for January 1910 advances the opinion that the fusiform bacillus is the organism we must oppose. Dr. Medalia recommends vaccines containing both staphylococci and diplococci, and others are experimenting with still other bacteria—which would seem to show that, if we are to depend on vaccines for the betterment of these pathological conditions, we will have to employ a good many different kinds of vaccines. The method of the injection of shotgun prescriptions of dead bacteria does not appeal to me as being rational in the average case, though I do not wish to discourage vaccine investigation. Dentists are skilful technicians, and there is doubtless not one here who is not sufficiently skilful in the surgical treatment of the roots of teeth to gain excellent results. Therefore, what is the use of treating patients with vaccines if we can obtain good results without them?

I have used stock as well as autogenous vaccines prepared by Dr. Ulrich of Minneapolis, and I must say that my successes have been fewer than my failures. If the root-treatment that Dr. Medalia referred to in his paper, and which he says should be carried out along with the vaccine treatment, were eliminated, his successes with vaccines would be fewer. Of course, from a combination of good surgical work and the use of vaccines, it is logical to expect good results. Let us use vaccine sparingly and with a certain amount of good horse sense, and only in those cases where we feel that it will be an aid to the surgical treatment.

Dr. T. Sydney Smith, Palo Alto, Cal. I am before you under unfavorable circumstances. It is the close of the day, you are very tired, and the time allotted me is not sufficient to do justice to such an important subject.

Our attitude in the past toward so-called pyorrhea alveolaris has been one of shameful neglect, and many of the methods we employed in treating it could not help being followed by failure. We have lifted the mystery which surrounded this disease, and we are now using rational, scientific methods. These not only prevent and cure pyorrhea, but also prevent at least ninety-five per cent. of cavities, so that our patients can retain their teeth to extreme old age. To

emphasize this thought, I shall divide the evolution of dentistry into four eras: First, that of primitive dentistry, the removal of teeth; second, the mechanical era, the invention of artificial substitutes; third, operative dentistry, the repair of teeth, and fourth, that of today, preventive dentistry. And it is from this last viewpoint that the subject deserves most consideration.

Let us first consider the laws which govern healing, that we may apply them correctly to pyorrheal pockets. To use an illustration: If the bifurcation of two fingers were extended through the palm of the hand and the parts kept separate, each surface would heal; then, no matter how they were sterilized and bound together, they could not reunite until both surfaces were surgically freshened and held together in surgical rest.

In applying these principles of healing to pyorrheal pockets, we must first correct the teaching regarding denuded cementum. Our eminent men have believed it to be dead. Even Dr. G. V. Black* told us about a year ago that the vitality of denuded cementum must be brief. As time will not permit me to go deeply into this matter, I will simply state that it cannot die while supported by a vital pulp and dentin. This makes it imperative to keep the pulp vital if possible. We must, therefore, not only remove all deposits from the cementum, but also expose the minute living cells by light, judicious scraping. How unreasonable, then, seems the old practice of applying severe germicides, acids, and pumice, which actually kill the cell life of these newly-exposed wound surfaces. Judicious scraping leaves the fresh blood in the wound to sterilize it and to form the matrix which connects the tissues. This blood-clot method is called "healing by first intention."

This brings us to the point where we must consider the septic condition of pyorrheal pockets, and view the vaccine treatment in a proper light.

Cultures made from exudates of these pockets reveal the fact that they do not always contain micro-organisms of the same group. We may find in the same pocket such pathogenic organisms as streptococci, staphylococci, pneumococci, besides the more harmless flora of the mouth. But we must remember that these organisms have lived for months and years in close contact with an abundant blood and lymph supply; their presence has stimulated the blood into the production of such bacteriolysins, precipitins, agglutinins, etc., as would fortify it against them. There can be no better proof of this than the fact that such pathogenic organisms as streptococci have been held in check for years. Again, if we employ this new method of surgical treatment, these pockets heal readily when left to nature's forces, showing thereby conclusively that antibodies are present, sufficient in kind and number to destroy the remnant of infection which our surgical work may not remove.

There is no doubt that autogenous vaccines do produce an increase of these specific anti-bodies, but in the treatment of pyorrheal pockets the tissues cannot reunite without the aid of the surgery which we have described, even if the antibodies were increased one hundredfold; and since, without the aid of vaccines, we find them in sufficient strength to permit a rapid healing, I ask why we should employ these vaccines.

We cannot intelligently use stock vac-

* *Items of Interest*, June 1911.

cines, because pyorrheal pockets do not always contain the same group of pathogenic organisms. And if we could include all organisms in any given case, such a vaccine would not be suited to their specific degree of virulence. We will understand more clearly the extreme specificity that is required of anti-bodies if we study hemolysis occurring from the infusion of the erythrocytes of one animal's blood into the veins of one of another species.

If we should take some of the normal serum of a rabbit and introduce the erythrocytes of a horse, it would have but little injurious effect upon the cells of the horse. But should we infuse some of the horse's erythrocytes into the veins of the rabbit, there would soon be a substance developed in the serum of the rabbit which would destroy the erythrocytes of the horse. The rabbit's serum would then contain an hemolysin which would quickly dissolve the hemoglobin from the stroma of the horse's erythrocytes. The specificity of this hemolysin is so pronounced that it would have no effect upon the erythrocytes of another species of animal so far removed from the horse as a dog, but it would have some effect upon the erythrocytes of the zebra or mule. This specificity is so accurate that the test would show the biological relation of these animals to the horse.

The rabbit's serum could contain several specific hemolysins at the same time, if it were stimulated by the erythrocytes of different species of animals.

This makes it very clear that if we use vaccines at all, they must be autogenous; only those prepared from the patient's own infection would be likely to include all of the organisms and to meet their particular degree of virulence. We can also see that the bactericidal agents developed within the body are beyond the power of man to imitate, and are the only bactericidal agents which do not interfere with the reconstructive properties of the blood, for they are normal to it.

Dr. Medalia (closing the discussion). I do not think it will be of any use for me to attempt to discuss in detail the statements that have been made by the various speakers. A great many of these statements would have been anticipated, had I been allowed the time to read my paper in full. The published paper will therefore explain several of the points here raised.

The fact that Dr. Laymon found staphylococcus aureus in five cases, and staphylococcus albus in all the other cases of pyorrhea does not, in my mind, justify him in considering the staphylococcus as the one and only organism responsible for pyorrhea, because we all know how harmless an organism the staphylococcus albus is, and how frequently it is present as a contaminating bacterium. Again, the fact that he obtained good results in those cases with autogenous vaccine does not mean that the results were due to the staphylococcus vaccine only, since he told me that he did not isolate the staphylococcus in making up the autogenous vaccine, but made use of all the bacteria found in the cultures.

In reply to Dr. Hartzell, if I had time to read my paper to the end, I would have said, so far as the opsonic index is concerned, that owing to the difficulties encountered in making this test it had to be abandoned as a test for clinical purposes. It is used, however, as an index of immunity in laboratory work on animals. The results obtained with vaccine treatment in bacterial infections is recognized today to be entirely independ-

ent of the opsonic index. With regard to his claim that the vaccine treatment is not feasible because of the difference of opinion among bacteriologists as to the real causative bacterial agent of this disease, I will simply say that, if Dr. Hartzell were more familiar with vaccine treatment and the preparation of vaccines, he would know that it makes little difference whether certain bacteria found culturally in this disease are called by one man a streptococcus and by another a pneumococcus in chains, since the autogenous vaccines used include whatever organisms are found culturally. Call them what you may, the name will not alter the contents of the vaccine nor its results.

With regard to the fusiform bacillus and the spirochæta dentium mentioned by Dr. Hartzell: The latter is an organism cultivated under great difficulties, and has been ignored by almost all investigators. The successful results obtained with vaccines not containing this organism is, in my mind, another criterion showing that the spirochæta dentium is not a causative factor in this disease.

The whole subject sums itself up in the simple question whether dentists, "who are pre-eminently technicians," as Dr. Hartzell says, are willing to remain tooth artizans and mechanics, or whether they wish to be dental surgeons and dental physicians. If they would be dental surgeons and physicians, they must do everything for the patient that will help him, and not limit themselves to mechanical treatment.

Dr. Hartzell says that he has treated successfully this disease by local measures alone. If that is the case, why, pray, is pyorrhea the "bugbear" of the dental profession? I would like to ask Dr. Hartzell to make a record of every case and follow it to a successful issue, and then present the results before us. If he already has such records, I could not discover them in the articles published by him.

In answer to the point raised by Dr. M. C. Smith with regard to the use of stock vaccine, I will say that I found the autogenous vaccine mixed with stock vaccine to yield the better results. Stock vaccines have to be used in incipient cases where there is no pus present and the cultures are found sterile. The stock vaccine, however, should be made up from bacteria isolated from cases suffering with alveolar osteomyelitis—pyorrhea—if good results are to be obtained, and not merely from cultures obtained indiscriminately from any source. Autogenous vaccine is preferred by all other investigators.

For a more explicit and comprehensive explanation to all the questions raised by the various men who took part in the discussion I shall have to refer you to my paper, which will be published *in toto.*

The chairman appointed the following committee on the question of the study of amalgams, pursuant to the motion made by Dr. Lundy at a previous session: Dr. T. P. Hinman, Dr. W. A. Price, and Dr. C. M. McCauley.

There being no further business before the section, Dr. Price, the chairman, declared Section I adjourned *sine die.*

SECTION II:

Operative Dentistry, Nomenclature, Literature, Dental Education, and Allied Subjects.

Chairman—F. O. Hetrick, Ottawa, Kans.
Vice-chairman—Joseph Head, Philadelphia, Pa.
Secretary—E. P. Dameron, St. Louis, Mo.

TUESDAY—Evening Session.

The first session of Section II was called to order on Tuesday evening, September 10, 1912, at 8 o'clock, by the chairman of the section, Dr. Hetrick.

The Chairman announced as the first order of business for Section II the reading of a paper by Dr. B. Holly Smith, Baltimore, Md., entitled "Aristocracy in Dental Education."

Dr. Smith's paper here follows:

Aristocracy in Dental Education.

By B. HOLLY SMITH, M.D., D,D.S., Baltimore, Md.

Carlyle says in his "French Revolution"—"Aristocratism rolls in its carriage, while patriotism cannot trail its cannon."

Those who are disposed to reflect upon the growth and progress of dentistry, to recognize its vast scope of usefulness to the human race, are bound to con over in their minds the causes of that growth, and to estimate whether the forces which have influenced it have been as effective as they should. As a prominent factor in that development, the dental college has, from time to time, come in for a great deal of criticism, much of which was just and helpful, but some of which, your essayist thinks, was neither fair nor well intended.

EDUCATIONAL PRINCIPLES OF EARLY DENTAL COLLEGES.

The beginning of the dental college was, fortunately, in the hands of men

who held in high esteem, and promulgated, a system of ethics which at once became the foundation of the new profession. From that time to the present there has been a gradual growth in appreciation of our services on the part of the people, and a corresponding development, on our part, of a keen sense of our responsibility to them. Associate and affiliate as much as we will with men of other professions or specialties, we are unwilling to have that growth of appreciation abridged or that responsibility divided.

In the organization of the dental college, the founders recognized the importance of having the strictly medical branches of the dental curriculum taught by medical men, so that physiology, anatomy, chemistry, and allied branches were always so taught; but these courses were always supplemented by dental instruction of a special character. For instance, to the course of chemistry was added metallurgy; to anatomy and surgery, special or oral surgery, to materia medica dental materia medica and therapeutics. In other words, the instruction was so shaped as to create a broad-minded specialist, equipped by training that could not be gotten in mere medical courses.

While in the early days of dental education the names of Baxley and Bond were associated in high esteem with those of Harris and Hayden, all the Bonds and Baxleys from that day to this have not and could not have made a dentist. This unique product is the result of the special training which alone could produce it.

MODERN TENDENCIES IN DENTAL EDUCATION.

It was the work done by these specialists, graduates of dental colleges, which caused medical schools and universities to consider it of sufficient importance to establish departments of dentistry in their institutions. These departments have done good educational work in a field where such work was needed, and where, but for them, it could not otherwise have been accomplished, and it is not the purpose of your essayist to criticize the results of that work. He does, however, deprecate a "holier than thou" attitude of mind which has recently grown up among them toward that class of education which existed before they entered the field.

Some of these special pleaders, without establishing their claim to authority and with no proof of superiority, have advocated the abolition of all dental colleges—strictly speaking—have charged against these institutions abuses and deficiencies which do not exist, and have fomented opposition and antagonism until some of their boldest followers are advocating doing away altogether with the degree of Doctor of Dental Surgery. They are barnstorming about at dental meetings crying—"Down with the D. D. S.!" "Come and take a ride in the university aeroplane!"

Not only have such advocates no respect for precedent, no veneration for the heroic deeds of their forebears, but they entertain a very mistaken notion of the needs of the hour. They exhibit a boastfulness and vanity never an accompaniment of the truly great. They would besmirch a title which great men have been proud to honor; they insult the flag under which the pioneers and leaders of our calling have so ably and successfully fought.

I never hear these theorists—and who attends meetings of our specialty that does not hear them?—without being re-

minded of words of wisdom (?) which emanated from a dear departed old bachelor friend on the subject of the proper bringing up of children. He denounced mothers in general as imbeciles or idiots, because they did not compel their children to wear tight-fitting caps which came well down over their ears, so that those appendages might be trained to sit flat against the side of the head and not stick obnoxiously out at an angle. The quotation "Little pitchers have big ears" aroused my bachelor friend to scorn, and the youthful chap who could hear from the distant meadow the cry of the plover, or from the deep tanglewood the sharp sweet song of the cardinal, possessed no advantage in his eyes.

THE LARGE UNIVERSITY DENTAL DEPARTMENT VS. THE SMALL DENTAL COLLEGE.

Dental education in the United States has made very satisfactory progress in the past seventy years. Since the organization of the Baltimore College of Dental Surgery in 1839, there has been a general and steady improvement in the methods of training, the preliminary requirements exacted, and the time occupied; until today the dental student must present for admission a diploma from a recognized high school or its equivalent; must spend three years of seven months each in attending upon lectures and demonstrations, and has the opportunity to spend the intervening time between sessions in the infirmary in the actual practice of dentistry. The equipment of the average dental college is ample; besides this, the institution becomes in any community a center of training, not only by the regularly authorized teachers, but by clinicians who are not connected with the school, but who by inventions or demonstrations of skill become prominent.

The almost inevitable output of these institutions should be prepared to meet the requirements of the most exacting; and yet we know that they do not invariably exhibit satisfactory evidence of proficiency. Much of the delinquency is due to personal characteristics or habits, and perhaps could not be weeded out by any system, but unquestionably much can and should be done to prevent the advancement to graduation of an inattentive or delinquent pupil. This, in the judgment of your essayist, can be done only by establishing a closer personal contact between pupil and teacher. In many of our professional schools the student is a free lance; if he makes good with the attendance officer and passes his examinations, nothing more is required of him. There is little effort made to discover and direct unusual outcroppings of genius or skill, or to better by advice or encouragement lapses of discipline or breaches of good habits. The pupil is left too much to his own resources, and many of his efforts are not well directed. He is more like a careless gleaner than one of a well-organized company of reapers. In the Baltimore College of Dental Surgery the students are divided into sections of eight, with a section captain and a section quiz. The section captain keeps in touch with his eight men, and reports to the teachers as to their progress and behavior. In this way, when a man is found to be falling behind, he is sought out, and an effort is made to start him over or help him up. Many times these men are simply involved in unfortunate companionship or are discouraged or homesick. In professional schools

where the classes run into hundreds, individual neglect is almost unavoidable. Frequent examinations, it is true, help to keep the whole class in line and at work, but many students need and should have the constant supervision and friendly advice of the teacher. During the seven years that I acted in the capacity of demonstrator, I can recall with great pleasure the wonderful unfolding of cleverness in the young dental operator, after a little straightening out by friendly advice and demonstration, whereas with pain I recall the blunderings of my own student days, when, for lack of these helps I often arrived by some circuitous and difficult route.

The problems of dental education, in the judgment of your essayist, will not be solved by any syndicate of universities with enormous classes a considerable proportion of which speak and can understand only a foreign tongue, but who, by the use of their quiz compends and other helps, move on with the army of students from promotion to promotion, and emerge finally by graduation without having a sufficient knowledge of the language to enable them to comprehend intelligently the lectures which they attended. No one would be so stupid as to deny that equipment is essential both to the individual and the institution, but no amount of equipment can take the place of the personal skill and ability of the operator or teacher. The latter must not only be well-informed in his subject and its corollaries, but he must be able to impart a knowledge of these to the student, and this he cannot do so successfully at a distance as he can when he is in close contact with that student. In the schools where the classes are smaller, the opportunities for this close personal supervision are greater, and the student is more than compensated for lack of volume in the "rah-rahs" of his class yell by the inspiration he gets from his close association with his experienced teacher.

NECESSITY OF POSTGRADUATE COURSES IN UNIVERSITY DENTAL SCHOOLS.

The value of this intimate relation is fully appreciated by everyone of experience. Who but can recall the wonderful influence upon operative procedure of such men as Robert Arthur, Varney, Webb, Bonwill, Palmer, Brown, and others? These men taught as clinicians, and their demonstrations were followed at the chair by as many as could see—those in the outer circle reaped practically no benefit. Postgraduate courses are today almost necessary to the students, because special training in small sections has not been carried out in the regular course. It certainly does not seem fair that, for this postgraduate instruction, the student is expected to pay a special fee to the very man whom the college circular advertises as its specialist upon that branch. If the student can be made more proficient by this method of teaching in small classes, then the method should prevail invariably, and not be a matter of selection by the student who can pay the price. If the advertised fee of the institution is not sufficient properly to compensate the teacher for teaching the whole class in the most effective way, then the fee should be raised, and so advertised. No one who is employed as a teacher in an institution should be allowed to accept a special fee from a student of that institution, and his services should be as free to one as the other. His ambition should be to send out only prepared men, and to this

end he should be willing to spend his time and effort freely with those who need it. If there is a place in the world for altruism, it is in the heart of the teacher. Everywhere we find him overworked and underpaid, and so, perhaps, it will always be, but the teacher has other compensations which count for more than money. No man who has really taught can cast a scornful glance at his past effort. He knows he must live on and on, in the execution by his pupil of the principles which he imparted.

DRAWBACKS IN THE DENTAL STUDENT'S ATTENDANCE ON MEDICAL COURSES.

In line with the argument for a closer contact between the teacher and pupil, I cannot avoid what I think is a just comment on medical schools and universities having dental departments, which, for economical reasons, compel their dental students to take many of their branches of study with the students of medicine. In many cases they form but a small minority of a very large class, but are compelled to spend their time in attendance upon lectures where the professors too often are poorly informed as to the principles in the science and art of dentistry. They are either ignored as to any special training in the subject or are treated as an ever-present source of pleasantry and amusement, both by the professor and their associates of the medical classes, not only in the lectures but also in the examinations. "Oh, you are only a dental student," not infrequently follows identification. Can anyone tell me that this is a wholesome atmosphere in which to build respect and love for one's calling? Does the makeshift hold his head higher under such identification? Is the time of the dental student most advantageously spent in picking up crumbs that fall from the medico's table, following, often at great distance, in the labyrinthine excursions through the domain of therapeutics and materia medica? If that medical professor were informed as to the necessities of the dental practitioner and condescended to lead him by the hand, well and good; but to make him a rank outsider, as is too often the case, involves both the institution and the student in a fraudulent transaction.

DURATION OF COURSE OF INSTRUCTION.

A knowledge of medicine is of unquestioned advantage to the dental practitioner, but any greater knowledge than is gained in the regular course of dental instruction should be acquired in other time than that which is allotted to obtaining a dental degree. In some of our universities, the D.D.S. and the M.D. degree have both been awarded after four years, the same time which is demanded for the acquirement of the M.D. degree alone. Certainly, an injustice on one of these degrees must have been perpetrated. Three years is short enough time to prepare the most earnest student for the practice of dentistry, and the Association of Medical Colleges has declared that four years is not too long to prepare the medical student to become a practitioner of medicine. Railroading students into both of these degrees in four years cannot be looked upon with favor.

THE TEACHER AS THE MOST IMPORTANT FACTOR IN DENTAL EDUCATION.

The most important factor in dental education is the teacher. Our schools

must involve in their work the co-operation of men of broad minds—men who are students, and who possess the rare quality of being able to impart information; men who can inspire the pupil with a desire to be a credit to his calling, who can persuade him to make the sacrifices required, and impress upon him the fact that college work is only the beginning, a training that will fit him for study which will yield greater results when experience is added to correct effort.

The Institute of Technology, which holds a yearly meeting of a few days, might readily hold a sort of summer chautauqua, where as many weeks could be profitably spent in demonstrating methods of teaching. It is safe to say that enthusiasm might be engendered and technique improved if, at some cool mountain resort, several of these meetings could be held in different sections of the country. The writer knows scores of men whom he would go a great way to sit under and hear explain the details of their work in the classroom—not all old men, either.

After all, the question is one of idealism, of unselfishness, of personal service; personality that will inspire, accompanied by the requisite knowledge and ability.

THE NECESSITY OF GREATER NUMBERS OF PRACTICING DENTISTS.

Statistics show that only ten per cent. of the people have any dental attention at all, that much over ninety per cent. are sorely in need of such attention. In almost every township and city in this country these facts are being impressed upon the authorities and people in general. A few municipalities are employing dentists to correct this evil, but the universal employment of such dentists seems to me the only solution of the effort to reclaim the teeth of the nation and restore their owners to health.

In the examination of the teeth of about a thousand children in the public schools of Baltimore, ninety-seven per cent. were found defective, and in many cases we were confronted with the statement that it was absolutely impossible for the parent to pay for dental attention. What are we going to do about these conditions, which probably prevail in most communities? If a laboring man, a father of five children, gets $1.50 per day, how many amalgam fillings at $2.00 per filling can he afford to pay for?

I do not want to cheapen dentistry, but I do wish to place needed dental attention within the reach of every man, woman, and child in this country. They need it for the protection of their lives, for the increase of their comfort and happiness, to augment their efficiency. It is our place to see that they get it. There should be thousands of young men and women working in municipal dental infirmaries for $25 a week, and there will be. The time is not far distant when any community which has proper regard for the health and comfort of its citizens will make some such provision.

If I am right in this prophecy, what five universities can train the army who will be needed for this service? A few of them, I expect, will have to be trained at the dental colleges.

Discussion.

Dr. H. L. Banzhaf, Milwaukee, Wis. The essayist has prepared a thoughtful paper—I may go farther than that, and say that I consider it a beautiful paper.

His diction and the flow of his words, the arrangement and expression of his thoughts, elicits my admiration, and it occurred to me while listening to Dr. Smith that it is pleasant to know that we have men in the dental profession who can lead us into the green fields and by the side of running waters in literature.

I have no intention, in fact it is contrary to my policy, ever to affront any audience by offering an apology, but I am sorry, nevertheless, that time did not permit the preparation of an analysis of Dr. Smith's paper. I read the paper over, but did not have the time to prepare an analysis, and I fear, therefore, that I might not do justice to the subject. It seems to me that the crux of the proposition is whether the attitude of the so-called dental departments of the universities toward dental education and toward the so-called private dental colleges is an equitable one; whether there is the proper co-ordination, or whether there is the proper sympathy for dental education and for the purpose for which dental colleges were organized.

I do not know whether there is a holier-than-thou attitude in dental education; possibly such an occasional expression may have been misinterpreted as being the thought of one man. Possibly he is the executive head of a university dental school, but I am inclined to think that he does not represent the thought, conviction, and belief of the teaching force of that school. I believe the teachers in a dental school, if they have any justification for being teachers, do more to make for thoroughness than a dozen executive heads of schools put together.

I am inclined to believe that there is room for all dental schools that so wish to conduct themselves honestly. There never was any criticism of dental colleges to amount to anything until some years ago, when so many dental colleges sprang into existence. Then, by and by, the supply became too large, as it were, and it was discovered that some schools had no endowment, which is an important factor, and their income was so small that they could not be properly managed. I believe, however, that time is curing these conditions, and there is a place for the majority of schools at least, so that we need not quarrel about this particular.

The essayist has spoken of the personal contact between teachers and students that exists in schools that have small classes. It does not necessarily follow, however, that small schools and small classes make for the greatest efficiency. Endowed schools, provided they have the necessary number and the right kind of teachers, can do quite as well as the smaller schools, however much I appreciate the element of personal contact.

The essayist has touched upon the social side of dental service in a very sympathetic and beautiful manner. The National Dental Association started some years ago a great health movement, and I can well understand why it is vitally interested in the kind of men who are entering the dental ranks.

Despite the essayist's criticisms, I think it is still possible for dental education to make progress and be of service to humanity. To use Browning's words, which you probably remember—

> Then welcome each rebuff that turns earth's smoothness rough,
> Each sting that bids nor sit nor stand, but go!

Dr. H. E. Friesell, Pittsburgh, Pa. I am somewhat astonished to see two papers on dental education on the program of the National Dental Association for this meeting. It seems to me that there are subjects of enough importance that belong particularly to the National Dental Association's province to eliminate for the time being the problems of dental education. In the past it has been said by overworked executive committees in state and national societies that a hit at the dental colleges would always start up an interesting discussion, but I do not believe in hitting anybody, unless there is a principle involved and unless it is intended to carry the issue to a proper solution.

As to this particular paper, I personally do not comprehend its aims, therefore my ability to discuss it is particularly limited. We have among the dental associations three that exist principally to cover these questions of dental education, and I think these bodies are able to take care of this question. The national and state societies should therefore be left to look after subjects that pertain more particularly to the work of the profession itself. The bodies mentioned are the National Association of Dental Faculties, the Institute of Dental Pedagogics, and the Educational Council of America. The National Association of Dental Examiners and the National Dental Association are represented on the Educational Council, and it seems to me that subjects pertaining to dental education should in the future be very properly referred to the Dental Educational Council as a section of this body to consider educational methods.

One item in the paper appeals to me strongly, *i.e.* that in the dental departments of medical schools and in many university dental schools various subjects in the curriculum are being taught by teachers who are not dentists, and the dental students are mixed with the medical students—as a necessary but relatively unimportant portion of the class. Personally, as a dental school teacher, I do not believe in these methods. I believe that every subject in the dental curriculum should be taught by dentists. Unfortunately, however, up to this time very few of our dentists seem interested in such subjects as anatomy, pathology, materia medica, bacteriology, etc., but this is the fault of the members of our dental profession. If you will give the schools teachers who are dentists, we can have the medical subjects that belong to the dental curriculum taught better by dental teachers than can be done by medical teachers. The combining of medical and dental students in studying a given subject is pedagogically and professionally wrong.

Dr. R. L. Simpson, Richmond, Va. If you had been in Baltimore during the democratic convention and had seen and heard Dr. Smith singing that Wilson song, you would have known that he was a genuine progressive, but from his paper tonight you would surely think he was a standpatter, going to vote for Taft.

Dr. Smith has attained much of his reputation because of his progressive ideas in dentistry, and it is with a great deal of sorrow that I have heard this paper. We have no imaginary thing confronting us; we have a condition to meet, and we must meet it squarely and without fear and trembling on our part. We must consider only the usefulness of dentistry.

Drs. Hayden and Harris never originally intended that there should be a separate degree. They tried to get dental

instruction incorporated in the medical course like other subjects, such as surgery and diseases of the eye, ear, nose, and throat. In taking the M.D. degree the student does not take simply the specialty he intends to practice, but he has a broad knowledge of all branches, so that he will know how far each branch extends into his work, and how intelligently to send patients to men who specialize in other lines. We need broader knowledge in dentistry, and when the essayist mentioned the names of Varney, Webb, and others, I could not help thinking how much more useful these men would have been if they had been more broadly educated. Dental education has been so narrow that we have hardly any D.D.S. who is capable of scientific research—we can point with almost unanimity to Dr. G. V. Black. The reason for this lamentable condition is that the D.D.S. degree has been given without a proper knowledge of the medical branches. It is a notorious fact that we dentists have been trying to deceive ourselves; we assure our patients that we receive an education in the fundamental medical branches, when we know that those fundamentals are largely abbreviated for the dental student. I cannot blame the medical men for saying, "Oh, you are just a dental student!"

WHAT IS OUR SALVATION?

In Virginia we have given an answer by passing a law, to go into effect January 1, 1914, requiring everyone who desires to practice dentistry to first secure the M.D. degree, and pass the Virginia medical board, and also pass two dental men attached to that board. We also have provided a way to prepare medical men to pass these dental examiners This law is not such a hardship; let me remind you that all colleges are increasing their entrance requirements, and we are getting into dentistry men who have better literary educations. Such men are demanding the right to transfer from one department to another —from dental to medical, or conversely. It is most embarrassing to dentistry when these men find they can transfer from medicine to dentistry with full credits, but not the other way, because their medical branches are abbreviated if taken in the dental course. This drives our best-prepared applicants into medicine, when they really would prefer dentistry. We find that more and more are state universities inclined to include in their B.S. degree some of the medical branches, such as bacteriology, chemistry, physiology, and others. Some of these days some state university will transfer such B.S. men to the medical or dental departments and graduate them in *two* additional years with the M.D. degree—*and they are not going to ask your permission either,* for the reason that these men enter the proper classes better prepared than you were when you entered them.*

Please excuse this rather lengthy explanation, but it is necessary.

Let me repeat my question, and answer it in a purely personal way. What is our salvation? The salvation of dentistry is the topheaviness of the medical degree. The colleges are not going to give a course longer than four years for

* [Since this statement was made, the University of Virginia has made its B.S. course so elective that a student for the B.S. degree may select the first two years of medicine as his last two years for his B.S. degree. This will enable him to secure both degrees in six years.—R. L. S.]

this, but they are adding to this course until it is almost impossible to take it in four years. Medicine has already developed into specialties—surgery, general medicine, eye, ear, nose, and throat diseases, diagnosis, venereal diseases, orthopedic surgery, etc. They all receive the M.D. degree. To our shame, dentistry is the only branch of medicine with an abbreviated course and a separate degree. Medical education has always taken longer and cost more than dental. At the same time there has never been a lack of medical men to fill places in charity hospitals. The trouble at present is to keep men out of medicine.

In view of these facts, I believe the time is coming when something like the following plan must be adopted:

Let every student who desires to study any branch of medicine, including dentistry, study the fundamentals for two years. For these two years of work, let him receive the B.M., or Bachelor of Medicine degree. If he does not know what branch he would like best, these two years will enable him intelligently to decide. For two years more he studies his specialty and so much of the other courses as will best fit him for his life-work. On the completion of these four years, let him receive the M.D. degree. In order that the specialties may be of equal value, the Carnegie system of units can be used to balance them.

By means of this plan dentistry receives trained students, with fundamental education the same as the others, and when the dentist receives his M.D. degree he knows, and the other specialists and the public know, that his course is the equal of any. Thus will the stigma be removed from us.

There is a demand, and a growing demand, for better trained dentists. The public is demanding better dental service; state boards are demanding that colleges give more thorough courses. The statement that a school is the oldest or largest means less and less each year. The demand now is, Tell us how your students stand before the state examining boards! Some here are not connected with the Faculties Association or Examiners Association, and it is only necessary to tell you that the reports of the joint Tabulation Committee from these organizations in reference to state board examinations are most interesting reading. Many of us find figures there that make us ashamed of our schools; figures that are eloquent reasons why university schools should exist—I mean genuine state universities. Thank God, we now have a Wiley in dental college affairs!

In the days gone by, the dental and medical schools were conducted at a profit, and they need not be ashamed of it. The men who *lectured* in those schools received a most satisfactory compensation, but the men who *demonstrated* received very little Medical education has already changed, and any medical school which desires to stand in class A must have at least six full-time demonstrators, and their pay must be satisfactory. Dental schools have just begun to wake up to this fact. It does no good for a lecturer to talk and draw on the blackboard unless he has an equally competent demonstrator in the laboratories to drill the facts into the students. Dental colleges are no longer going to tolerate conditions that have existed in the past. In other words, the didactic teacher, no matter how celebrated he may be, is of no greater importance than the demonstrator. These poorly paid demonstrators are going to demand

as good salaries as they deserve. Demonstrators in pathology, in bacteriology, histology, chemistry, and physiological chemistry are also necessary; then the independent dental school will cease to be profitable to a few of the professors who own it Thorough medical education costs more than the income from students, and this fact renders state aid and endowments absolutely necessary. In view of these facts, ladies and gentlemen, I believe the independent medical and dental school is doomed, and we may as well realize it now as later.

For fear you may think that I am ashamed of my D.D.S. degree, I wish to assure you that there is nothing I more esteem. God bless those men who have done what they could! I honor and revere them; they set the standards of the times, and they did splendid work, but they and their methods are no longer needed. The world progresses.

No, gentlemen, we do not need an aristocracy in dentistry; we need broader education, better education, and men in the profession who are willing to serve and sacrifice themselves as medical men have done, for the good of the public, and not for self alone.

Dr. George E. Hunt, Indianapolis, Ind. The paper seems to be a protest against some university schools' attitude toward some of those schools which are not parts of universities, and I cannot help but have a bit of sympathy, naturally, with the essayist's attitude. I believe all who are interested in the education of the incoming members of the profession are honest in their interest. We who are educating the youth of the land in dentistry all desire to do our best, and I believe there ought to be an aristocracy in dental education—but a real aristocracy, and not a pseudo-aristocracy or a mushroom aristocracy. I mean that there should be better teaching forces in the development of the education of the young men who are coming into our profession. All who are interested in the education of our young men are of the same belief, and since we are all working toward the same end, it is to be deprecated and deplored that there should be any dissension in the ranks of the educators. I trust that will be eradicated in the course of time, as other dissensions have been.

Dr. Smith (closing the discussion). Dr. Simpson said he was very sorry. I think the audience should agree with him. I, too, think he is very sorry.

The next order of business was the reading of a paper by F. E. Stewart, M.D., Philadelphia, Pa., and entitled "What is Meant by Drug Standardization?" as follows:

What is Meant by Drug Standardization?

By F. E. STEWART, Ph.G., M.D., Philadelphia, Pa.

A visiting physician of one of the large Philadelphia hospitals called me up by telephone for information regarding the failure of fluid extract of apocynum to relieve dropsy in three patients under his care. Finding that he did not know whether or not the fluid extract had been standardized, I suggested the use of a standard preparation. Three or four days afterward my medical friend again

called me up to report that the standardized fluid extract procured at my suggestion was promptly effectual, and said: "If standardization means so much for other drugs, it is about time for the medical profession to awaken to its importance."

IMPORTANCE OF DRUG STANDARDIZATION.

A prominent Canadian physician, to whom I was demonstrating the modern methods for drug standardization in the laboratory, said: "The medical profession knows in a general way that drugs vary in strength, but only few physicians are aware of the wide variations in such important drugs as digitalis, strophanthus, and apocynum demonstrated here today. We know that some bicarbonate of sodium is pure, and other lots are purer. This is about my limit of knowledge, but that digitalis fluid extracts on the market may vary 300 per cent. in active constituents, and strophanthus fluid extracts show a variation of 6000 per cent., is an eye-opener to me."

The importance of drug standardization is so great that all intelligent persons, laymen as well as members of the medical and pharmaceutical professions, should be informed of its value. For without this knowledge physicians do not realize the necessity of discriminating in favor of standardized products when prescribing, pharmacists do not appreciate the necessity of standardizing their products, or purchasing their supplies from manufacturing houses engaged in standardization work; and people ignorant of the fact that preparations of the same name may differ so widely as to be dangerous to life, take prescriptions to drug stores where they can get them compounded at the cheapest price, without regard to the character, quality, and strength of the ingredients that enter into them.

NOMENCLATURE.

One of the first factors of importance in the consideration of drug standardization is nomenclature. To every drug a name must be given by which it may be invariably known and dealt in. The Latin language is generally employed, because it is a dead language and is not liable to change, as is the case with a living language.

The name adopted must belong to the common language of science, and not be commercially controlled. So-called trade-mark names or trade names do not meet the requirements of science. If the product is not provided with a scientific proper name, standardization demands that the scientific societies should name it, or the government might well do so in connection with the enforcement of the pure food and drug law. As for the trade names, text-books are adopting them as generic appellations or synonyms without protest from the manufacturers, who therefore cannot justly complain if competitors adopt them for describing identical products.

METHODS OF STANDARDIZATION.

Botanical standardization is absolutely necessary in establishing the identity of vegetable drugs. *Capsicum fastigiatum* is the botanical name for the variety of capsicum designated by the U. S. Pharmacopeia. *Capsicum* indicates the genus, *fastigiatum* the species, to which the plant belongs. In relation to medicinal chemicals the U. S. P. gives in the "pu-

rity rubric" the amount of permissible innocuous impurities in each case. More than this amount the substance must not contain to comply with the U. S. P. standard.

Preparations of chemical drugs are standardized by chemical assay. The same applies to preparations of vegetable drugs containing active principles susceptible to assay chemically. But there are a number of important preparations of drugs which cannot be satisfactorily standardized in this manner. I refer to the preparations of digitalis, aconite, cannabis indica, convallaria, ergot, gelsemium, lobelia, squill, strophanthus, and veratrum. These preparations are standardized physiologically by tests on animals.

Physiological or pharmacodynamic standardization is likewise employed for standardization of adrenal glands, thyroid glands, etc.

Antitoxin and curative sera are also standardized physiologically; bacterins (bacterial vaccines) are standardized by bacterial count. The strength of old tuberculin is approximately determined by clinical tests, and the same applies to smallpox vaccine, while the newer tuberculins, "T. R." and "B. E.," are standardized by determining the content in solid substance.

LEGISLATIVE REGULATIONS.

The Food and Drug Act of June 30, 1905, made the United States Pharmacopeia and the National Formulary official standards for interstate commerce in drugs and medicines. Most of the states have enacted similar legislation. Consequently drugs and preparations sold under the U. S. P. and N. F. names, must be made in accordance with the standards laid down by these authorities, or they are misbranded and are liable to seizure by the government. Manufacturers and dealers who do not follow these standards are amenable to the law. The national law and the laws of most of the states permit the sale of products differing from these standards, if the differences are plainly stated on the labels. Some of the state laws are more strict and permit no deviation.

EXAMPLE SHOWING THE ABSOLUTE NECESSITY OF STANDARDIZATION: APOCYNUM.

By way of illustration let us consider the method of physiologically standardizing fluid extract of apocynum. Apocynum belongs to the group of so-called heart tonics, of which digitalis is the chief exponent. I have two reasons for considering apocynum first. One is that it permits a continuance of my story relating to the use of this drug in the treatment of dropsy in the clinical service of my medical friend; and the other is the opportunity of pointing out the advantage of physiologic tests for a drug not properly standardized botanically.

"Fluid extract of apocynum" is the U. S. P. name for a preparation of the "dried rhizome and roots of *Apocynum cannabinum,* or of closely allied species of apocynum," and is made by percolating the dried and powdered drug with a mixture of alcohol, water, and glycerin. The Pharmacopeia directs that each cubic centimeter of a fluid extract shall contain the active constituents of one gram of the drug from which it is prepared. Fluid extract of apocynum should therefore represent the drug volume by weight. In other words, one minim (drop) should approximately rep-

resent in activity one grain of the dried and powdered drug.

Apocynum is commonly known as Canadian hemp, or black Indian hemp, and is also called incorrectly "Indian hemp." It belongs to the *Apocynaceæ,* or dogbane family. This remarkable family of plants consists of about 130 genera, including more than a thousand species, growing abundantly in most tropical countries, thence decreasing to rarity in temperate regions. The plants are trees or erect climbing shrubs, rarely perennial herbs, and are among the handsomest and many of them among the most fragrant in the vegetable kingdom, and are largely used for decoration. Otherwise, except for a few edible fruits, and the rubber-yielding species (African rubber is chiefly the product of this family), this species is interesting chiefly from its medicinal and poisonous properties. So numerous and abundant are these plants, and so generally and intensely poisonous are they, that their appearance should be noted by everyone, to be avoided. A botanical description would exceed our space limit.

The active constituents of the plants are alkaloids and glucosids, which may be encountered in any of the plant parts, but are especially common and abundant in the bark and seeds. Among savages these are very common agents of criminal, military ordeal, and legal poisoning, and accidental poisoning by them is not infrequent. Some of the most powerful arrow poisons are derived from this family.

We are in complete ignorance as to the species of apocynum which should yield this drug. Up to a very recent period, five or more distinct species were included under the name *Apocynum cannabinum,* even in our standard botanical works, and the plants themselves are not distinguished. It is therefore impossible to ascertain which species should yield the drugs whose actions have been reported under that name. This fact doubtless explains, in great part, the conflicting testimony regarding the medicinal activity of the drug.

The drug as it appears on the market is of indefinite length, one-eighth to one-third of an inch thick, cylindrical, wrinkled, fissured, orange brown, becoming gray brown on keeping, almost inodorous, and in taste starchy, afterward becoming bitter and somewhat acrid. The active constituents are the bitter glucosids, apocynin and apocynein. Its effects are similar to digitalis (common name "foxglove"). Apocynum is usually given in the form of fluid extract, the average dose of which is 5 minims.

From the foregoing it must be very apparent to any thinking person that fluid extract of apocynum, when prepared from a drug not properly standardized botanically, is a very uncertain preparation. As already stated, we are in complete ignorance as to the species of apocynum which should yield this drug; so we are not sure when purchasing it that we have the species containing the glucosids to which its medicinal value is due. No way is provided by the Pharmacopeia for determining whether and in what quantity these constituents are present. Even though an assayed drug should be employed, no directions are given to ascertain whether the finished preparation contains them in proper amount. Unless the finished fluid extract is subjected to standardization, the dose of five minims may be too large, or, on the other hand, the preparation may be inert.

Is it any wonder under such circumstances that the hospital physician who called me up did not obtain satisfactory results from fluid extract of apocynum in the treatment of dropsy? But a very different report followed the substitution of a standardized fluid extract. The dropsy which threatened the patient's life commenced at once to yield, and the heart and kidneys to resume their functions. Let us therefore consider how fluid extract of apocynum is standardized.

Apocynum belongs to the so-called "digitalis series," which includes digitalis, or "foxglove," apocynum, convallaria (commonly known as "lily of the valley"), squill, and strophanthus. The drugs of this group have the peculiar power of stimulating the heart, and are of enormous value in the treatment of certain diseases of the heart and kidneys. When given in medicinal doses, they cause the heart to contract and empty itself with greater force, thus restoring the circulation of the blood to the kidneys and other organs in case of heart weakness.

This property of strengthening the heart's action is invaluable in dropsy, in which impaired circulation is a prominent factor. By their action on the heart and arterial system—which is, in fact, a continuation of the heart, by reason of its muscular walls with their contractile power aiding the circulation—such drugs as apocynum, digitalis, and strophanthus also act as diuretics. Forcing more blood through the kidneys, they aid in purifying the blood of urea—the ash of tissue waste—and so preventing death from uremic poisoning. By their use the most severe forms of dropsy may often be quickly relieved, the weak and dilated heart restored to normal action, and the patient at death's door returned to fairly good health and continued many years in a life of usefulness.

STEPS IN STANDARDIZING.

The first step in standardizing preparations of drugs is to assay the crude drugs before purchasing. The manufacturer of standardized drug preparations would soon find himself out of pocket if he neglected this precaution. Drugs are of value in direct proportion to the active principles they contain, and these constituents vary in different lots.

The next step consists in assaying finished products and adjusting the amount of active principles present to fixed standards. This is accomplished either by chemical assay, or by physiological tests on animals, or by both methods, one being used as a control for checking results obtained by the other.

STANDARDIZING BY THE "LETHAL DOSE" METHOD.

A number of physiological methods for standardizing the digitalis series of drugs are in use, among which is the so-called "lethal dose" method of Reed and Vanderkleed. The first step in this method consists in determining the lethal dose; this is accomplished in the following manner: A series of guinea-pigs is selected, each weighing approximately 250 grams. The preparation to be tested, if a tincture or fluid extract, is then freed from the greater part of alcohol by evaporation, and diluted with water to the desired quantity. Into a series of four of the guinea-pigs this dilution is now injected in amounts equal to 9/10, 10/10, 11/10, and 12/10

of the standard lethal dose. The animals are then placed in cages and allowed to remain for twenty-four hours, when they are examined, and a note is made of those which are living and those which are dead.

The result of this preliminary test, in which the range of dosage is quite wide, enables the investigator to form some idea as to the strength of the preparation. Basing the dosage upon these results, other series of guinea-pigs are injected with progressively increasing or decreasing doses, as the case may be, still further diminishing the variations between doses, until the smallest amount is found which will prove fatal within twenty-four hours. The probable minimum lethal (toxic) dose of the preparation, unless it deviates considerably from that of the standard, is generally obtained by one or two series of injections.

In order to express the percentage results, it is necessary to adopt for each drug or preparation assayed a standard minimum lethal dose (m. l. d.) with which the preparation being tested may be compared. For example, the m. l. d. of fluid extract of digitalis is 0.1 cc.; that of fluid extract of strophanthus, 0.0025 cc.; that of tincture of strophanthus, 0.025 cc.; that of fluid extract of apocynum, 0.075 cc. After comparing the preparation to be standardized with the standard m. l. d., it is diluted or concentrated, if necessary, to bring it down or up, as the case may be.

As already stated, digitalis fluid extract on the market may vary 300 per cent. in strength. This fact was stated in Bulletin No. 48, issued by the U. S. Bureau of Hygiene, Washington, D. C. Later researches show the variation to be from 30 per cent. to 400 per cent.

FATAL RESULTS OF SLIPSHOD METHODS.

Now, as digitalis is one of the most important drugs in the treatment of diseases of the heart and kidneys, and conditions often arise in practice when the patient's life is entirely dependent upon its prompt and decided action, accuracy in dosage is essential. Unless the dose is large enough to produce the required effect upon the heart and circulation, failure results. If the dose is too large, the patient dies of digitalis poisoning. Imagine the danger resulting from neglect to use standardized digitalis preparations: The patient takes the prescription to the druggist, who secured his pharmaceutical education before the advent of the modern drug standardization, and obtains a fluid extract or tincture below standard. The dose prescribed fails to relieve the patient, and is therefore increased. We will assume that the tincture is prescribed in 15-drop doses. This dose failing to relieve, 20-drop doses are given, to be rapidly and progressively increased for effect until 60 drops are used per dose, and the same administered three times a day. After a week or more the phial is emptied, and the patient sends to the drug store for renewal of the prescription. In the meantime the druggist has purchased a fresh supply of tincture of digitalis which happens to be three times as strong as the weak preparation first used. The patient goes on with the 60-drop dose as before. But now he is taking three times as much drug at a dose, or an amount equal to 180 drops. The toxic action of the drug soon manifests itself, the patient grows worse and worse, and finally dies in convulsions which are

ascribed to uremia—when they were, in fact, due to digitalis poisoning.

"How careless the doctor!—how careless the druggist!" say you. Nay; rather say, "How ignorant and negligent are both of the importance of drug standardization!"

Or, the physician, fearing to give larger doses of digitalis than that laid down in the text-books as a maximum, goes on with his ineffectual dosing, and the patient finally dies in uremic convulsions. In either case death is the result, and the cause is the same—namely, want of standardization of the digitalis preparation employed.

CENTRAL BOARD OF CONTROL ADVOCATED.

It may be asked why not separate the active constituents and use them for medication instead of trusting to the uncertain fluid preparations of the drug? There are insurmountable difficulties in this matter; in the first place, the active principles of digitalis are only partially known, and the isolation of those with which we are acquainted is attended with considerable difficulty. There appear to be at least four glucosids in digitalis which possess the characteristic action on the heart and circulation, and these are accompanied by one or more glucosids decidedly different in their effect. The therapeutic action is composite and is due to the combination of a number of principles which act and react on one another to produce the characteristic effects of digitalis as a therapeutic agent; therefore, the only way to be sure of obtaining the desired effect is to use a physiologically standardized preparation of digitalis itself.

Therapeutic standardization by the cooperative investigations and impartial discussions of competent observers are necessary. Progress in scientific materia medica is dependent upon it, and public welfare demands it. How can we as physicians meet our obligations in this regard when new products are controlled commercially and introduced by advertising? Until some plan is adopted for the protection of professional interests, impartial discussion is impracticable. If reports concerning advertised products are adverse, there is a danger of lawsuits; if they are favorable, there are suspicions of purchase. A strong central board of control representing commercial as well as professional interests is urgently needed, to prevent dishonest exploitation of common interests by selfishness.

DETERIORATION OF DRUGS BY THE ACTION OF THE AIR.

One of the problems of standardization is to prevent the finished product from deterioration on account of the action of the air. Preparations of ergot, digitalis, strophanthus, aconite, and several other important drugs soon lose their strength on this account. It has never been realized until lately that most of the deterioration going on in fluids owing to the action of the air, is due to the air held in the fluid rather than to the air in contact with the fluid in the container. For example, a container may be completely filled with a fluid and then hermetically sealed, yet the oxygen of the air in the fluid will continue to act and cause its deterioration.

Researches were made in the Mulford laboratories by Pittinger and Vanderkleed to determine the influence on deterioration of exhausting the air from fluids, and then sealing them hermeti-

cally under vacuum. Fluid extract of ergot was chosen for the experiment. First of all, the fluid extract was tested by injection into dogs, and gave an immediate rise of blood-pressure represented by 44.8 mm. of mercury. The total assay for alkaloids by the process of Meller gave a percentage of 0.163. This fluid extract of ergot was then divided into four portions, as follows:

A: The first portion was put up in vacuum in tubes specially designed and made for this purpose.

B: The second portion was filled into bottles which were tightly corked, and allowed to remain for one year unopened.

C: The third portion was filled into bottles which were kept loosely corked for one year, this being obtained by boring a small hole in the cork.

D: The fourth portion was tightly corked, but opened occasionally throughout the year.

These four samples were tested upon dogs at the end of twelve months, with the result that, with A, no loss of blood-pressure-raising power was sustained; this was also true of the percentage of total alkaloids. Of the other samples, the tightly corked sample, B, deteriorated the least (about 35 per cent.). A greater deterioration was noted in C, while D (bottles tightly corked, but opened occasionally, under which conditions the preparation is commonly kept) showed the most marked deterioration (67 per cent.).

These investigations would indicate that, with complete exhaustion and exclusion of the air from the container and its contents, practical permanence may be secured.

CONCLUSION.

I hope my paper has proved of sufficient interest to excite your desire to investigate the subject of standardization more deeply, and I am sure, if you do so, that many astonishing revelations await you. Among other things you will discover one of the causes of therapeutic nihilism, and you may find out that drugs possess powers undreamed-of, that can only be revealed by drug standardization.

Section II then adjourned until a later session.

THURSDAY—Morning Session.

Section II was then called to order on Thursday morning, September 12th, at 10 o'clock, by the chairman, Dr. F. O. Hetrick.

The first order of business for the morning session was the reading of a paper by Dr. H. H. Johnson, Macon, Ga., entitled "Inlays," as follows:

Inlays.

By H. H. JOHNSON, D.D.S., Macon, Ga.

SINCE the days of pioneer dentistry, with its crude equipment and forceful methods, an ever-increasing demand has been made by reluctant victims for more humane time-saving processes.

NECESSITY FOR TIME AND NERVE-SAVING DEVICES IN MODERN DENTISTRY.

In compliance with this demand we have, step by step, made repeated advances. But as we have progressed toward more humane methods, the advance of civilization, with its rapid pace and ever-increasing grind, has continued to raise the nerve tension of mankind to a point where men are less able to stand punishment and have less endurance. Thus each improvement has been felt as a necessity to meet ever-growing conditions, and each has been hailed with delight by both operator and patient.

But even with all these modern helps and conveniences, most of us have found it necessary at times to test the endurance of patients to the limit with rubber dam and long-continued malleting, to insert, piece by piece, a large cohesive gold filling.

Many of our expert gold-builders have had their vital force weakened or destroyed in the very prime of life—for example, the late lamented Marshall H. Webb and others. We therefore owe a debt of gratitude to our gifted collaborators who, conscious of this necessity and their own overtaxed strength, have applied their minds at various periods to devise ways and means of shortening these taxing operations by accomplishing like results with less expenditure of nerve and vital power.

THE EVOLUTION OF THE GOLD INLAY METHOD.

Thus, by a kind of evolution, the inlay has been brought up to such a degree of perfection that it can successfully take the place of large-contour, cohesive gold fillings. As is the case with many other improvements, no one person may take full credit for these valuable ideas, for many, even more than can be mentioned, have had a hand in its development.

Dr. G. V. I. Brown reported methods of gold work of this nature in the *Dental Review* of June 15, 1891. More strictly speaking, these were "outlay" fillings, made after the burnishing method, and consisting in an outer plate only, cemented with gutta-percha. Dr. Brown at this time reported that he had successful pieces of this work under observation which had been made eight years previously.

In 1894, at Old Point Comfort, Dr. S. W. Foster of Georgia read a short paper describing a successful method of making what he termed "laboratory fillings." These were gold inlays made by flowing solder on a burnished platinum matrix. He reported that he had cases two years old which were still doing good service. (See *Dental Cosmos* for September 1894, page 720.

Dr. C. L. Alexander also—"the wizard of North Carolina"—endeavored for a long time to perfect his method of gold inlay and hood work so that he might present it to the profession in a high state of development. At Asheville, N. C., before the Southern Dental Association, on July 28, 1896, he presented a paper, elaborately illustrated (see *Dental Cosmos,* October 1896, p. 850), describing the most valuable and perfect system of gold inlay and hood work that had ever been read before a society up to that date, and probably up to the present time.

Many of us in the South took private instruction of Dr. Alexander in his burnishing methods of hood and cast work, and have been wonderfully rewarded by the durability of the fillings and the strength and esthetic effect of the hoods in supporting anterior ends of bridges. Others have developed methods of burnished work supported, as his was, by staples or pins, but the records give Dr. Alexander priority for his original and perfect system, and the members of the dental profession owe him a debt of gratitude.

About 1896 the late Dr. W. G. Browne of Georgia demonstrated before some of the southern state societies what might be termed "hollow gold inlays," but which he named "outlay gold fillings," as they consisted in a shell of gold covering a filling of cement. The system had advantages and did its part in developing the inlay system.

A joke is told of the only original R. C. Young of Alabama that he accidentally discovered an inlay system. While giving a clinic before a class of students in contour cohesive gold work, just as he was hammering home the last few pieces to complete the filling the instrument slipped, and he accidentally displaced the filling. Quickly turning to his audience, he said, "Now I have come to the idea in this work which I wished to show you." Removing the filling intact, he quickly mixed some cement, filled the cavity with it, and forced the inlay back into place. Finding this idea good, he has since made many inlays in this way.

While these methods of inlay work are good and practical, its development did not stop here. Before the Odontological Society of New York, January 1907, Dr. W. H. Taggart of Illinois read a paper, published in the *Dental Cosmos* for November 1907, p. 1117, describing the wax molding method of casting gold inlays. No method that had previously been suggested was so quickly and universally adopted; that it was a valuable and practical idea was apparent from the very beginning, and Dr. Taggart certainly deserves the thanks of the profession for his method of applying this idea to inlay work.

It was quickly adopted because of the seeming simplicity and novelty of the process, and because the practicability of inlay work in saving teeth had been previously fully established, first by the porcelain inlay, and later by the Alexander methods.

LIMITATIONS OF THE WAX MOLDING METHOD OF CASTING GOLD INLAYS.

Time, experience, and scientific investigation are beginning to show that the simplicity of the Taggart system is somewhat of a delusion. It has been shown by various scientists that the working qualities of the materials involved render it difficult to obtain perfect results. No one can deny, however, that

by this wax molding method inlays can be made which either fit well enough for practical purposes or can be trimmed to such a fit by using burs and wheels for a sufficient time. It will be a difficult problem to perfect the method beyond its present state of development, because the shrinkage and expansion of the bolus of metal, as well as the waxes and investments, can hardly ever be entirely overcome. The larger the cavity the more necessary and desirable it is to make a cast filling, and the larger the bulk of metal the more shrinkage and expansion take place.

Dr. W. A. Price, in a very scientific article, published in the *Dental Cosmos* for March 1911, p. 265, covering the shrinkage and expansion of waxes, investments, and golds, as affecting the perfect casting of inlays, gives the following factors of error: (1) Decreased size of the gold reproduction due to its own contraction; (2) change in the dimensions of the wax pattern by the cooling when removing; (3) change in the dimensions of the wax pattern by changes in temperature while investing; (4) changes in dimensions of the investing medium in the process of heating and cooling; (5) in casting over right-angle corners, the passing of the fluid gold over the sharp corners has the effect of brushing some of the investment away; (6) air-bubbles at the marginal groove through error in investing.

Other writers, as Lane and Van Horn (see *Dental Cosmos*, May 1909, p. 546; August 1910, p. 873; June 1911, p. 664; October 1911, p. 1109; August 1912, p. 890; September 1912, p. 973), have elaborated on methods of overcoming shrinkage and expansion, thus admitting the imperfections of the system. Indeed, one has but to make a few castings of saddle fillings in bicuspids and molars to note that this shrinkage is a factor to be reckoned with from a practical standpoint. Such fillings may be made to approximate a fit by careful grinding and burring, but they can seldom be made to seat without these changes.

THE ALEXANDER PLASTIC INLAY GOLD METHOD.

The more recent experiments of Dr. Alexander have effectually overcome all of these objections, and given us a method that is absolutely freed from shrinkage, expansion, or warpage. The Alexander plastic inlay gold can be molded directly into the cavity and invested in a small bolus of investing material, the shrinkage and expansion of which has no appreciable effect on the filling. The porous mass of gold is then solidified by flowing 22-karat solder into it. The result is a perfectly fitting inlay that has sufficient hardness to withstand mastication thoroughly.

If a higher karat is desired than would be obtained with plastic gold, moss fibre or Corona gold may be used. By using cotton rolls to protect the parts from moisture, the mold of the cavity may be made with these golds unannealed, building in and condensing large pieces until the desired fulness and contour have been obtained. The gold mold may be removed by inserting an exploring point into its surface at a point away from the margins, and lifting it out. The mold is invested in a bolus of investing material leaving some portion of the occluding surface exposed. The mass is then completely solidified by melting 22-karat solder into its surface. The solidity of the condensed mold will prevent its taking up very much solder, and will

therefore represent a high karat as well as a hardened mass.

In many, not to say the majority of cases, it has been found that a matrix of thin gold greatly facilitates the process of molding the gold directly into the cavity. The matrices are best made of either No. 30 rolled gold, No. 60 gold foil, or Tatham mesh gold. A piece considerably larger than the cavity is cut out, annealed, and placed over the opening. It is so soft and pliable that it may be partially swaged to an approximation with a pledget of cotton in the foil pliers. After this either the Alexander plastic inlay gold, moss fibre, or Corona may be packed into the matrix with sufficient force to adapt its surface to the walls of the cavity. When the cavity has been filled with the gold, the matrix containing the gold mold may be carefully removed from the cavity and the surplus overlapping parts of the matrix cut away with a pair of embroidery scissors, when the filling may be returned to the cavity for a final burnishing and adaptation of occlusion. The matrix and gold mold or unsolidified filling may then be removed for investment. The investment is preferably made with S. S. White investment compound No. 4. This material has a coarse-grained consistence, so that it may be dried rapidly without cracking, and its composition eliminates contraction and expansion. The investment is made by mixing a small quantity of the material with water to the consistence of model plaster. A quantity of the size of a small marble is placed on a piece of paper, and the gold mold is dropped into it with the cavity side down. The mold is tamped down into the investment, and the material worked up over the margins until all is covered except a small opening in the center of the occlusal surface. The investment may be placed at once upon a wire frame over a Bunsen flame for heating up. The necessary quantity of 22-karat solder, well boraxed, is laid over the opening leading into the filling, the blowpipe is applied from beneath, and heating is continued until the solder melts, when it will literally drop into the porous mass of gold beneath, filling in the interstices and solidifying it. The operation is so simple that little time need be consumed in the process. The thin gold matrix does not affect the fit, as it can readily and perfectly be adapted to every cavity surface, and is a decided advantage in many cases, as it assists in removing the mold of gold from the cavity without distortion, attracts the solder, and tends to pull it down through the mass of gold above. Emphasis is placed upon the impracticability of using thin platinum as a matrix instead of thin 24-karat gold. Platinum is too harsh and unyielding, and should never be used.

Fillings made after this method need no cutting or grinding to adapt them to the cavity, as there is no shrinkage or warpage from expansion or contraction of metals or investment. Every step is direct, there is no transferring from an impression to a mold, and no wax to shrink or expand.

I would emphasize the fact that it is easier to make a perfect mold of the cavity with plastic inlay gold than with wax, and the adaptation is much more certain. It is also easier to make a mold with plastic gold than with moss fibre or any of the fiber golds.

Plastic gold is applicable for occlusal surfaces of crowns, backings of porcelain facings, the mounting of Logan crowns, etc. The certainty of a fit, the time saved in adjusting, to say nothing of the time lost in burning out wax molds, as re-

quired in the Taggart process, is well worthy of consideration.

SUGGESTIONS FOR MAKING ALEXANDER GOLD HOODS.

Before closing, it might be of interest to call attention to Price's artificial stone as a help in making the Alexander hoods. After the tooth is prepared and the staple or the pins used are in place, an impression of the tooth is taken with Dr. Price's special wax. The pins or staple will come away in the impression. A model of the tooth is made in "artificial stone." The thin 40-gage, 24-karat gold may now be burnished over the stone model, and to facilitate burnishing the gold may be soldered to the pins or staple with a tiny piece of 22-karat solder to form an attachment to hold the unfinished hood in place. All annealing and soldering can be done on the stone model, as it stands the heat perfectly. When the adaptation is complete, solder may be flowed over the surface of the gold to the thickness desired, thus completing the hood.

Discussion.

Dr. D. J. McMillen, Kansas City, Mo. Although I have not had time to read the paper beforehand and digest it, there are a few points that I should like to touch upon.

First, in regard to the inlay as a time-saver, I am not prepared to say that it is the best possible means of restoration in every mouth and every tooth. The essayist does not maintain that, but there are many operators who believe that an inlay must be put in every tooth and in every cavity, and they have almost discarded their operative instruments and are making more inlays all the time. This, in my opinion, is a mistake. The inlay is a time- and a nerve-saver, and in its proper place is unexcelled.

The essayist tells us that in 1890 a dentist was doing this kind of work. In 1891 or '92 I went to the Texas state meeting in Waco, and at that time saw an inlay which was called a box filling. It was made by burnishing a layer of gold into the cavity and fitting it to the pulpal wall; over that matrix another piece of gold was fitted to approximate the tooth form, and the occlusion was obtained by the patient biting into the outside layer of gold. These two pieces of gold were soldered together, and fitted into the cavity. The whole was then removed, a hole bored through the outer layer, and the inside filled with solder. The inlay was then cemented into position and seemed to be a nice piece of work. This kind of work has been done for the past eighteen or twenty years. For many years I have, in a few instances, made inlays. My first one was made in a crude way. I burnished a piece of gold around on the outside of the cavity, soldered a loop on the under side, and thickened the metal on the outside. This was cemented back into the tooth, and the inlay burnished around the margins. Many ways have been suggested of doing this work. Dr. Simpson of Kansas has for many years employed various methods, such as burnishing gold into the cavity, sweating solder into the matrix and building the filling up, but after all is said and done, we might as well acknowledge the fact that the Taggart system is the first expedient system for doing this work.

Dr. F. W. Stiff, Richmond, Va. I am very much in the position of Dr. McMillen, in that I did not have the

privilege of seeing this paper before it was presented. I have done considerable inlay work since Dr. Taggart perfected it, but I have found the same difficulties in my work that Dr. Johnson has so well explained, viz, shrinkage in large fillings, particularly saddle fillings in molars and bicuspids. I hail it as a boon to dentistry, notwithstanding what Dr. McMillen has said of the Taggart method, that Dr. Alexander has discovered a method which to my mind is better.

I helped Dr. Alexander in Birmingham to demonstrate his method, and I was convinced that it was superior for making large fillings. The trouble that I had in my work, however, was that I could not obtain the same accuracy of fit as Dr. Alexander. He has, however, improved his method since; he did not at that time use plastic gold.

I have no criticism to make of the paper. It covered the ground and was particularly beneficial to me in that the minutiæ of Dr. Alexander's method were explained.

Dr. L. L. Barber, Toledo, Ohio. By way of explanation, I will say, as all other speakers have done, that I did not know that I would be called upon to discuss this paper until three or four minutes before Dr. Johnson read it. I have used Alexander's plastic gold for some years; before that I used to take ordinary plastic gold and put small bits of wax on the top of it, heat the wax with a burnisher, and allow it to flow into the gold. With this material I made fillings, compressing it to produce contour, allowing the patient to bite to ascertain the occlusion, investing it, and flowing solder into it to make a solid filling.

Dr. Johnson started to tell us how simple the Alexander method is, but I noticed that he used Price's artificial stone.

Dr. Johnson. Not in making inlays, but for hoods.

Dr. Barber. At any rate he uses Price's artificial stone, making a matrix from that and packing the gold into that. To certain people almost any method is simple and easy, but after all, it is a matter of absolute technique. The essayist said that, in making a wax model and a casting from it, the sharp edges were likely to be destroyed by the molten gold wearing off the investment, which might hold air-bubbles. He might well have said that the cervical margin of the filling would quite likely not be a good fit, among other things. I believe that most of these failures are due to carelessness of the operator. It is wrong for an operator to think that he can take a piece of wax at any temperature, warm it a little, put it into a cavity, simply jam it down, make the patient bite on it, take it out of the mouth, carve it a little, invest, and then obtain a casting that will fit. I have made good inlays, and I have made my share of poor ones. I suppose I made one or two hundred inlays in my laboratory, before I attempted to make one in a tooth in the mouth, and even so I have made my share of poor ones. I can, however, almost invariably trace my failure to careless technique. It is not an easy matter to take a piece of inlay wax, no matter by whom it is manufactured, heat it to the proper temperature, and obtain a good accurate impression of an approximal cavity. I have seen operators prize or pull the wax from the cervical part of the cavity, and the defects in their wax patterns were hardly noticeable, and yet the cast inlay made from such a pattern was very defective. Air-bubbles, as you know, will

make little globules of gold on the cavity side of the inlay, but such imperfections can be very largely overcome. I have made many cast fillings and have inserted them into the cavity without having to retouch them—but I have also made many others. I have used Dr. Alexander's gold, and I think it is admirable.

Dr. Barnes of Cleveland, with whom I have worked for many years, has a method quite as simple, which in his hands is the best universal method that I have seen demonstrated anywhere. He simply takes No. 4 soft foil, presses it into the cavity with orange-wood sticks, obtains the occlusion, takes the gold matrix out and lays it on a charcoal block, and instead of flowing, just sweats small pieces of 22-karat gold into it with the aid of a blowpipe, thereby obtaining the most beautiful fillings I have ever seen. After all, it is a matter of each operator getting down to a method and studying it until he knows it from A to Z.

Dr. Spalding of Detroit also has a splendid method, involving the use of Detroit modeling compound, which is obtainable in sticks of about the size of a finger. He prepares the cavity, takes an impression with this modeling compound, makes a model of the cavity with alloy mixed quite thinly, allows this to stand over night, and then makes his filling in that model. After this he takes the bite in wax, and can then finish the filling on the amalgam model, so that it is ready to be placed in the tooth when the patient returns. In this way, the making of a compound filling for a molar is considerably simplified. If the cast filling draws a little, it is put back on the model and pinched together with a pair of pincers. Dr. Spalding does this work so well that his inlays cannot be distinguished from malleted fillings. After all, no matter what method is used, it depends upon the dexterity and the care with which the technique is carried out.

Dr. Johnson has covered the ground very well in his paper, and I have no criticism to make, except that I wanted to emphasize that no method has been discovered so far that anyone can say is easy. That is what we are all looking for, of course, but with all the easy methods in dental work that we have heard of, the fact remains that if we would do our work well, we must follow every step with care, and in this way we will succeed, or at least come a good deal nearer perfection.

Dr. Johnson (closing the discussion). I have very little to say in closing the discussion. I wish, however, to refer to the amalgam method which Dr. Barber has mentioned. It seems to me that this method, consisting in taking an impression of a cavity, making a model from that, and then the wax mold, involves so many factors of error that we would simply get a rough casting of gold. One might in that way become an expert carver in fitting the cavity of the amalgam model; still, an imperfect impression of the cavity to start with remains as the source of probable error, and we have to fit the inlay, after all, to the cavity in the tooth. It seems to me that this method is a roundabout way. By the Alexander method the filling is done directly in the cavity with the gold itself. There is no transferring at all, no shrinkage or expansion, therefore the inlay must fit better. The making of the model requires no more time than that of a wax mold, and all the investing and drying out is saved, hence economy in time. Saving of time does not mean

slighting the work. This method is simply a shorter one, and, if time can be saved by shortening an operation, at the same time doing the work perfectly, it is worth while to save this time, because for many busy operators time means money.

The next order of business as announced by the chairman was the reading of a paper by Dr. W. R. CLACK, Mason City, Iowa, entitled "Is Operative Dentistry Degenerating?—Extension for Prevention *vs.* Pinhead Methods," as follows:

Is Operative Dentistry Degenerating?—Extension for Prevention *vs.* Pinhead Methods.

By Dr. W. R. CLACK, Mason City, Iowa.

IN 1891 Dr. Black gave to the public the result of his researches concerning recurrence of dental caries at enamel margins, and the tendency to be dislodged by the stress of occlusion of fillings made in the proximal surfaces of molars and bicuspids and retained only by pits or parallel grooves. At the same time he indicated a method whereby these difficulties might be overcome. Since that time there have been many differences of opinion as to what those methods were, and as to what he really did or did not say concerning those principles.

THE ATTITUDE OF THE DENTAL PROFESSION TOWARD DR. BLACK'S PRINCIPLE OF EXTENSION FOR PREVENTION.

Many men who had access to Dr. Black's operating room at Jacksonville, Ill., and who were granted the benefit of his personal instructions, were able to grasp his ideas at once and apply them in practice, with benefit to themselves and their patients. But the larger number tried to learn from articles in the dental journals, with the result that comes to the majority who try to learn operative dentistry from print. Some of these operations were "fearfully and wonderfully made," and nearly as many teeth were ruined by the misapplication of the Black principles as were lost under the old pinhead methods; but these men profited by their mistakes and sought by every means in their power to obtain a better understanding of what Dr. Black intended to teach under the head of extension for prevention, and eventually won out.

Others never took the trouble to investigate the principles taught by Dr. Black, but opposed them for various reasons. First of all was the objection that these "revolutionary methods" were propounded by a man living west of the Alleghanies, and as all dental knowledge —as knowledge—was known to exist only on the eastern slopes of these mountains, and as the expounder was not a shining light in the dental atmosphere of the "older sections," but had actually sprung from the common people of the West, it was thought best to ignore this fanatic and his teachings.

Secondly, to admit the truth of his contention would necessitate a change in the methods that had been taught since

"Washington crossed the Delaware," and that was not to be thought of, so the word went out to ignore as far as possible and to treat with silent contempt these methods that were incorrect simply because they were opposed to the teachings of the "fathers."

But study clubs were formed all over the central West, and either Dr. Black or some of the men who had studied with him would act as censors, correct the errors, and teach in their stead the true gospel of saving the teeth.

The club which is perhaps best known to the dental world is the G. V. Black Club of St. Paul, Minn., organized on May 20, 1898, and incorporated on December 10, 1902. Dr. E. K. Wedelstaedt of St. Paul has been the censor of operative dentistry since the organization of this club. Monthly meetings were held, and as soon as a sufficient number of operators were able to demonstrate these methods, annual midwinter clinics were given, at which Dr. G. V. Black always appeared in person, and all questions of operative procedure were referred to him, and his opinion was final as far as the teachings of that club were concerned. From this club and others in Iowa, Illinois, and Missouri, went out the men who were mainly responsible for the spread of the doctrine of extension for prevention.

I have explained at length the origin and spread of extension for prevention, and the make-up of its sponsors, because the class of detractors spoken of have seen fit to convey the idea that extension for prevention is a sort of "catch-colt" indigenous to that region which a century ago was the home of the buffalo and wild horse, and without either legitimate parentage or godfathers.

It is a source of great sorrow to the dwellers of the western prairies to learn that "their originality has been a shock to the old civilization" east of the Alleghanies. But the truth was this: These unfilial children had tired of waiting for the fathers to evolve a method which would do away with the necessity of remaking every two or three years the pinhead fillings that had failed owing to recurrent caries.

They wanted a method by which they could make a filling in a cavity of the first or second class that would be permanent. Twenty-one years ago Dr. Black began his teachings of extension for prevention. The suggestions he made have been thoroughly tried out; in some cases they have been modified, and in some intensified, but the original principles still stand as they were given out. A very large percentage of the dentists of the middle West have proved to themselves and to those who have given the matter careful attention that those methods when intelligently carried out will save the human teeth.

It makes no difference, as a matter of fact, if the opponents of extension for prevention yell themselves black in the face crying—"In the end it is a failure." Too many thousands of dentists have tried its merits, and know for themselves.

Extension for prevention prevails today in the central West. It has strong advocates in every state west of the Mississippi, and is being taught in greater or lesser degree in nearly all the dental colleges from Pittsburgh and Buffalo to San Francisco.

It is being taught in Tufts Dental School and in Harvard—the "Athens of America"; New York City has its Conzett Club; Wedelstaedt and Searl clubs abound in the western states, and there

is even one in far-away New Zealand. The latter club has at different times sent delegates to spend from three to six months at a time with the different members of the Black Club, learning their methods and carrying them back to the islands of the South Pacific.

If the principles of extension for prevention are wrong, and its advocates, as has been asserted, have written little upon this subject, why is it that it has obtained such a hold upon the dental world? Is it not a calamity that the select coterie of standpatters sat so snugly in their mandarin coats of conservatism and let this evil spread over the country? Why did they not arise in their might, and, like Mrs. Partington, attempt to sweep back the tide, before it overwhelmed the world?

RULES FOR CAVITY PREPARATION BY THE BLACK METHODS.

In the preparation of cavities in the human teeth according to the Black methods, certain rules are laid down, some of them relating to extension for prevention, some to retention, and some to interior preparation.

RULE 1. Extend the cavity margins in all directions until sound enamel is reached.

RULE 2—Seat. The seat must be flat or in steps (which is equivalent), and at right angles to the long axis of the tooth or the direction of the stress.

RULE 3—Preparation of the margins. Cut the enamel to such a point that the surface of the filling may be so formed that the enamel margin will be self-cleansing, or be protected by the gum margin.

RULE 4. Do not leave an enamel margin in such a position as to leave a small portion between it and one of the developmental grooves.

RULE 5. The lingual, buccal, and axial walls of all cavities exposed to stress should be parallel to each other and to the line of stress.

RULE 6. Leave no enamel unsupported by dentin, except on the labial surfaces of the upper anterior teeth.

RULE 7. A fissured, sulcate, or angular developmental groove should be cut out in its entire length.

PROXIMAL CAVITIES AND FILLINGS.

Cavities of decay in proximal surfaces of teeth—and this is where extension for prevention applies chiefly—are seldom presented to the dentist until a smaller or larger quantity of the enamel rods have fallen out. When this is the case it would be poor practice to fill only a pinhead-size cavity, because there would be recurrence of decay if the patient lives. The gingival margin of the cavity should be carried beneath the free margin of the gum. This free margin is not so far rootward as the men who have opposed this method without knowing the details of the work would have us believe.

Though it is not a part of extension for prevention, all students of Black are taught to restore the normal interproximal space, and to preserve it by tight contact points in all fillings made in the proximal surfaces of the human teeth. When this is done, the gum will return to its normal position and securely cover and protect the gingival margin of the filling without this filling being carried "to the dentin of the root, cutting away the cementum and pericementum and dangerously encroaching on the pulp—and, in any event, subjecting that organ

to thermal shock that in due course of time will arouse an inflammation there and ultimate devitalization, with pathological sequelæ not pleasant to contemplate."

What a vivid imagination! If all this terrible trouble arises from polishing a filling just under the free margin of the gum, what unheard-of horrors will follow a pyorrhea treatment where the root is "scraped clean" to the very apex!

We are taught that every particle of deposit on the cementum of the root must be removed. In that case, what becomes of the pericementum that originally covered the root? I am not advocating the needless destruction of a particle of the tissues in the interproximal space, but am at a loss to know why, if we can trust nature to repair the damage caused by the deposit thought to be responsible for pyorrhea, and by the removal of this deposit, it is necessary to go into hysteria because someone makes the gum bleed a little in finishing a filling. Not that such a result is any more necessary where extension for prevention is practiced than where it is ignored.

If the standpatters could spend a few golden hours at the chairs of some of the progressives of the land of the buffalo and wild horse, and see how quickly the gum will cuddle down behind one of those contact points, and fill the whole interproximal space with healthy gum tissue beneath which bacterial plaques do not form, they would see that the slight irritation caused by the finishing of the filling at the gingival margin does not bring about all the disastrous consequences so pathetically painted by those word-artists of a past age.

If we may not place and finish the margin of a filling under the free margin of the gum without subsequent loss of the tooth, what, may I ask, do these ultra-conservatives do when a patient presents himself with a cavity of decay in the proximal surface of a tooth in which, from backward decay, the cavity extends under the gum and often into the concavity of the tooth?

This is one of the teeth that "need saving." The advocate of extension for prevention saves these teeth, because he makes a filling there, and finishes it smoothly so that it will have no overhang and irritate the gum; then he makes a contact point to protect it, and trusts to the same power that made the tissues in the interproximal space in the first place to restore it to normal condition.

I had the honor of showing to this association at Buffalo, seven years ago, casts of cases in which such restoration of the gingival tissue had taken place. Some of the men who saw them acknowledged that the restoration had taken place, but asserted that it would not be permanent. I have here today some of the identical casts which I showed at Buffalo—they will no doubt be recognized by many who saw them there—and I have casts made from impressions taken from the same cases within the last two weeks, which show that the gum septa are as perfect today as they were seven years ago. The teeth show a slight shortening from seven years' wear, but the fillings, contact points, and gums remain the same. In one case a third molar has been erupted.

In each of these cases, the first molar had been lost several years, the teeth had drifted apart, and food pockets had formed so that caries had affected the concavity of some of them. I was obliged to remove some of the alveolar process in order to make my restora-

tions. The casts will prove more eloquently than words how perfectly nature restored the lost tissue after I had made it possible for her to do so.

PREPARATION OF CAVITIES IN OCCLUSAL SURFACES OF MOLARS.

The simplest form of cavity is one in the occlusal surface of a molar. As this surface is usually self-cleansing, little extension is required when gold is used. All margins must be carried to smooth surfaces in order that they may be properly finished, and all imperfect developmental grooves must be included in the preparation. No enamel should be left unsupported by dentin.

The walls are made parallel to each other and at right angles to the pulpal wall or seat of the cavity. This seat should be flat. All enamel margins are beveled when gold is to be used; about fifteen degrees is a safe rule. To these rules, however, I make two exceptions. The first one comes under the head of extension for convenience. When operating on lower second and third molars, and sometimes upper third molars, the mesial wall of the cavity must be beveled at an angle of forty-five degrees to nearly one-third of its depth, else the gold will not be condensed against that wall, as the line of force of the plugger will be faulty, and the gold will be driven away from that wall; but with a heavily beveled margin, the difficulty will be overcome.

This rule does not apply to cavity preparation for an amalgam filling. For amalgam, the margins are not beveled, but planed smoothly so that there are no overhanging margins or short enamel rods. *Care must be taken, however, in placing the margins.*

The mesio-lingual cusp of many upper first and second molars is often of such a shape that, if it occludes on the margin of an amalgam filling in the central pit of a lower molar, that margin is in great danger of fracture. If that margin is extended so that the point of the cusp does not strike it, the life of that filling is greatly lengthened. This is precautionary extension.

PREPARATION OF CAVITIES IN PROXIMAL SURFACES OF ANTERIOR TEETH.

We will next take up cavities in the proximal surfaces of the anterior teeth, using the mesial surface of an upper central incisor for an example. These cavities almost invariably start just gingivally of the contact point, owing to the inability or neglect of the patient to keep that surface properly cleaned.

First, all overhanging enamel is cut away, then the cavity margins are extended under the free margin of the gum gingivally and labially until the margin of gold will reflect the light. This procedure will put the margin where it will be constantly cleansed.

The lingual margin should be extended to the crest of the mesio-lingual line angle or mesial margin ridge. If there is lack of sound dentin to support the enamel, cutting must be continued until the enamel is so supported. The margin is extended incisally just past the contact point.

No half-moon should be cut in the labial surface. If the dentin in the linguo-axio-gingival and labio-axio-gingival angles and in the incisal angle is squared out, ample retention will be afforded.

If an angle in an anterior tooth has been lost, the cavity is prepared in practically the same way gingivally as the

one last described, but the preparation of the incisal third differs very radically.

Take for illustration an upper central incisor with a cavity in the distal surface involving the incisal angle. For retention and protection from occlusion we resort to a step, cut in the incisal portion, but mostly at the expense of the lingual surface.

A step is ground in the labio-incisal angle deep enough to permit of sufficient gold being packed there to protect the labial plate of enamel from the stress of occlusion. This step is deepened on the lingual surface sufficiently to permit of cutting a groove in the dentin between the lingual and labial walls. This groove should end in a small pit just before or just beyond the opposite developmental groove. If there is sufficient dentin, the groove may be slightly widened near the end, and the small pit dispensed with. The angle formed by the union of the step with the axial wall is slightly rounded.

PREPARATION OF CAVITIES IN THE PROXIMAL SURFACES OF BICUSPIDS AND MOLARS.

All cavities in the proximal surfaces of bicuspids and molars are prepared on the same general plan, varying slightly as the positions of these teeth in the dental arch may vary, the principles applied being the same.

Caries in these surfaces is the result of habitual uncleanliness, and it is essential that the buccal, lingual, and gingival margins be extended to self-cleansing areas, if we wish to avoid recurrence. The lingual, buccal, and axial walls must be made parallel to each other and at right angles to the gingival wall. Where this is done, the lateral walls are too weak to permit of grooves for retention, so that we are compelled to resort to a step in the occlusal surface. This step should be cut just through the enamel, and should include all the imperfections to be found in that surface.

The pulpal wall—or floor—of this step must be flat, and the surrounding walls at right angles to it. The angle formed by its junction with the axial wall should be slightly rounded.

Formerly, the lingual and buccal walls were cut to diverge as they approached the gingival border, with a view to better retention, but now many operators cut these walls parallel so that the same cavity may be used without change either for a gold filling or an inlay.

Dr. Conzett and I have given many clinics on this subject.

DEPTH OF CUTTING.

But this is merely an interior detail and does not necessarily come under the head of extension for prevention, but I have spoken of it to show that the very deep cutting with which the pinhead cavity conservatives charge the advocates of extension for prevention exists only in the imagination of the former. Unless caries has already penetrated more deeply pulpward, we seldom cut as deeply as the retaining pits made by the pinhead cavity men. On hearing some of them talk, one would think that they anchored their fillings in the enamel, but such is not always the case.

I will pass around for inspection a tooth extracted by the patient's physician because of incessant pain. In this tooth the pulp-chamber was penetrated by one of these retaining pits. I prepared a cavity in the same surface of

the tooth, going a trifle deeper than would have been necessary in the first place, in order to square out the axial wall to the depth already cut, and, as will be seen, there are two of these retaining pits remaining, much deeper than the so-called "ruthless sacrificer of human teeth" ever thinks of going.

STEP AND DOVETAIL ANCHORAGES.

The one great argument in favor of the step anchorage—both occlusal and incisal—is that it places the resistance at the point at which the dislodging force or stress is applied.

There is another form of anchorage which is sometimes used for fillings in the anterior teeth, where the angle is involved, and which is more esthetic than that described, and successful if no stress is brought to bear on the filling.

This method consists in cutting a dovetailed slot in the lingual surface of the incisor or cuspid, and anchoring the filling in that. Stress, however, is a factor that must always be reckoned with. Stress is difficult enough to overcome when we are opposing it on even terms, but in this case we are giving it the long end of the lever.

In many cases the curvature of the gingival line is so great that by cutting squarely across the tooth for the gingival seat either that margin would be left exposed at the linguo-gingival and labio-gingival angles, or we would cut too deeply toward the gingival line at the middle third. To obviate this, the seat may be cut on a curve from labial to lingual, which will afford the same stability of the seat and avoid cutting into the gingival line. But the seat must be flat from the axial wall to the beginning of the cavo-surface angle.

TERMINOLOGY.

In this connection I would digress a moment in an effort to make clear the difference between the gingival *line* and the gingival *margin*.

Gingival line. The line around the neck of the teeth at which the gingiva is attached, the line of junction of enamel and cementum.

Gingival margin. The portion of the tooth next to the gingival line.

Gingiva. That portion of the gum tissue enveloping the necks of the teeth crownwise from the attachment at the gingival line. The free margin of the gum.

Gingival curvature. The deviation of the gingival line from the horizontal in its course around the neck of the tooth.

EXTENSION OF CAVITY MARGIN UNDER THE GUM MARGIN.

Carrying the seat or wall under the gum margin is good practice, and insures freedom from recurrence of caries. This is taught and practiced by the followers of Black.

Carrying the gingival wall or seat under the gingival line is malpractice, and is not now, and never has been, taught by the followers of Black. But it has been persistently taught by the opponents of extension for prevention, as witness the following quotation from an article on page 414, of the *Dental Cosmos* for April 1912. The author of this article states that—"It is not the writer's purpose to answer Dr. Clack or to defend Dr. McCullough's paper. His aim principally is to *give his own views* on this much neglected subject."

He then proceeds to tell us how a cavity is prepared under extension for

prevention rules, and, when he has arrived at the making of the gingival wall or seat, he says: "To proceed with the illustration, the pinhead cavity is then carried down below the gingival border. To accomplish this the said cavity must be extended to the dentin of the root, cutting away the cementum and pericementum, and dangerously encroaching on the pulp."

The making of such an extension is not now taught by Black's followers and never has been taught by them. Those who have never investigated extension for prevention fail to differentiate between placing the gingival margin of the filling under the gingival margin of the gum, and placing it under the gingival line, and I challenge any man to show me a word written by a man acknowledged to be a Black disciple advocating the cutting below the gingival line, and into the dentin of the root. "This is all an hallucination of the man who is opposed to extension for prevention."

EXPERIENCES WITH PINHEAD CAVITY METHODS.

No doubt many of you will be disappointed because I do not deliver myself of a tirade against the pinhead cavity and its followers, but I have it not in my heart to do so. Why should I? Was I not one of them myself for fifteen years? My old preceptor from Rome, N. Y., taught me to make those pinhead fillings in the proximal surfaces of the teeth. Not only did he teach me to make them that way, but he taught me to make all cavity preparations with hand instruments. He never used a dental engine, and I practiced a year without one myself. I have gone through all these "throw-away-your-pluggers" sieges, and still have all my pluggers. I have the old ivory-handled hand drill and pluggers with which I prepared cavities and filled them thirty-nine years ago, and it would be a mistake to think that I cannot use them today.

The ability to manipulate gold is like the ability to swim; the man who once masters the art, never forgets it. I am not ashamed that I was once a pinhead operator. I was one because I was taught so, and knew no other method. I was honest in my efforts to save teeth, and was probably no better and no worse than the men who practice that way today. But during those years I had so many patients who had "soft teeth." It was remarkable how the enamel margins melted away around those "concealed" fillings in two or three years. Then I had to fill those cavities again, telling the victim—"If I can only keep your teeth until you become immune, you will be all right yet," and it was a remarkable coincidence that by the time recurrence of caries had extended the margins of the cavities to self-cleansing areas, the "period of immunity" came for these teeth, and there was no recurrence of caries. I was a wonderful operator! I had saved those "soft teeth," and I could save the rest of the patient's teeth just as soon as the margins had extended to lines of immunity.

A CONVERSION TO EXTENSION FOR PREVENTION METHODS.

I was particularly impressed with these observations in the late eighties, when I had been in practice at Clear Lake for ten years, and I remember telling other dentists that my large fillings

lasted the best, but I could not see why, after the patient had reached the age of immunity, the pinhead fillings in his teeth should continue to fail in the same manner. In this way I stumbled along in the dark until, in 1891, I read Dr. Black's articles on "The Management of Enamel Margins" published in the *Dental Cosmos*. Then I knew why the margins I have spoken of were immune. I read more of his writings and thought him an extremist, but I followed him—a long way off—and tried to make a compromise between the method I had been taught and the method I imagined him to be teaching. But soon it was my good fortune to meet Dr. Black, and hear from his lips the principles of extension for prevention. Then began ten years of monthly trips to the G. V. Black Club of St. Paul, where, under the teachings of Dr. E. K. Wedelstaedt and Dr. A. C. Searl, I became soundly converted to extension for prevention. I believe in it, I practice it, I preach it, I teach it, I dream it, and, if occasion requires, I fight for it. And my own experience has been the experience of hundreds of other dentists who are now unqualified advocates of extension for prevention.

This fact, of course I realize, does not necessarily make our claims true, but just as we may judge a tree by its fruit, so extension for prevention has certainly borne fruit that a Burbank might well be proud of.

A trial of twenty-one years has demonstrated that the principles of extension for prevention, if intelligently carried out, will prevent recurrence of caries for ten, fifteen, and twenty years. What more can we ask, and what other method can show like results? I am aware that there are men who, by misstating methods of procedure and attempting to ridicule the West because it is not the East, can convince themselves that extension for prevention is a failure, just as conclusively as the medieval Italian philosophers proved (?) that the theory held by Galileo that the earth revolves on its axis was incorrect. Think of it! Only a few hundred years ago a man was imprisoned, was tortured and excommunicated for believing that the earth revolved. To save his life a man of seventy was obliged to kneel once a week for three years and recant his belief. But it is reported that old Galileo, on arising from his knees, would stamp on the ground and exclaim, "E pur si muove!" (It still moves!) So methinks it has often been with "Galileo" Black. When treated with silent contempt, hissed, ridiculed, misrepresented, and maligned, he has smiled his quiet smile and affirmed—"Extension for prevention still prevents."

Discussion.

Dr. C. V. Vignes, New Orleans, La. Dentists seem to be divided into two classes, those who are in favor of extension for prevention, and those who are in favor of prevention by extension. I do not know to which class I belong; whether I am one of the extension kind or merely a little pinhead one. The extremist who practices extension for prevention is so decidedly "sot" in his ideas that he condemns anyone who should want to practice conservatism; while, on the other hand, the ultra-conservative dentist sees nothing in extension for prevention but a wanton destruction of tooth structure. The great trouble has been, is, and probably will be for a long while to come, that we are not willing

to give our fellow man credit for being able to do that which we cannot do. Until all teeth are alike, and the conditions surrounding them are identical, no set rule can or should be adopted. We will have to continue, as I understand it, to prepare cavities with a little judgment, meeting the conditions as we find them.

Dr. E. T. Darby, Philadelphia, Pa. I do not know why I have been called upon to discuss this paper, unless it be that I am an eastern man. I regret that Dr. Clack thinks there is antagonism between the East and the West in the matter of so-called extension for prevention. As far as I am aware, there are no eastern men who oppose it because the term "extension for prevention" came from the West, nor are they opposed to the principle. Dr. Black has a great many admirers in the East, and they are quite ready to express their admiration. I have long been familiar with the enthusiastic work done by Drs. Wedelstaedt, Searl, Clack, and other members of the G. V. Black Club, and I am confident that they have done great good by the thoroughgoing principles which they have taught.

I would not wish to detract in the least from the credit which Dr. Clack has given in his paper to Dr. Black and others, but I regret that he failed to mention Varney and Webb and Perry, who taught and practiced the same principles which he set forth in his paper. Dr. Varney was among the first to promulgate the belief that all approximal surfaces should be contoured to their original fulness, and that all cavity margins should be left in such position that they could be made self-cleansing. Dr. Webb advocated and practiced the same, and more than thirty years ago Dr. Perry read a paper upon the subject of the treatment of approximal surfaces in the bicuspids and molars, in which he advocated the same principles as laid down in Dr. Clack's paper.

If you ask me whether I indorse all that Dr. Clack has said in his paper, I would reply "Yes, I indorse all that he has said about the bicuspids and molars." It is what I teach and what I try to practice, perhaps with a little less perfection than the men of the Black Club. I teach it because I think it is correct treatment for those surfaces, but when it comes to the incisors, I fear I am not orthodox, if that means sacrificing the whole or nearly the whole of the approximal surface in order to fill a cavity of the size of a pinhead. But pinheads are of various sizes, and some would represent a large cavity. It seems to me that here is a good place to exercise judgment as to which teeth should be cut as extensively as indicated by Dr. Clack, and which shall be cut less. Those of us who have been in practice for forty-five years —and I see classmates of mine in this audience—know that many incisors with small cavities, which we filled forty or more years ago, are still being saved by those fillings. Of course, many such fillings have failed, but there are good and bad fillings, as there are good and bad teeth.

The chief objection to such general cutting is the display of so much gold, but since porcelain and silicate cements are promising so much, it is to be hoped that the anterior teeth can be saved without the necessity of displaying the filling, which under the most favorable conditions is objectionable.

Dr. Clack (closing the discussion). I am very much disappointed. I had thoroughly believed in the honesty and

integrity of the men who have opposed extension for prevention, but when the gauntlet is thrown down, and these men are notified months in advance that this matter is to be discussed, and that it is to be discussed partially from statements that they have made, it seems to show a lack of courage on their part when they fail to stand up for their own convictions and fight for what they believe to be right. These men who will refuse and neglect to reply openly to criticisms of their methods, so that their arguments may be answered, and then take advantage of the pages of a dental journal and make their statements in such a way that they cannot be successfully controverted without a great deal of trouble—these men, I believe, from now on, are unworthy of notice. Many points in my paper were brought out because of the criticism that has been made in one of these articles. I have no animosity in my heart toward eastern men as such, as might appear at first sight from my remarks, which were so worded because of the article published in one of the journals by a man whom I respect very much, and who is one of the recognized leaders of the opponents of extension for prevention. It was the slighting manner in which he spoke of the West, and the youthfulness of the men in the West, and the ideas advocated by them, that led to my remarks.

I am very much gratified indeed by Dr. Darby's remarks, and I wish to explain shortly our position. No one for a moment attempts to claim that Dr. Black originated all there is in extension for prevention. The truths embodied in extension for prevention have always existed, and there have been many men who have taught these truths, but very few of these men have taught these truths in such a manner that they could be thoroughly understood. Dr. Darby has referred to the excellent operations made by these old masters, but these men did not arrive at a clear and concise method that governed all their operation. I have not the slightest doubt that the lamented Dr. Webb would in time have evolved a system; after him, Dr Black took up the work, and I believe you will bear me out in saying that he was the man who absolutely systematized that method. His investigations of thousands of teeth containing fillings made after the manner of Dr. Webb and his *confrères* proved that these teeth had resisted the ravages of caries for many years, while fillings made in the other way did not. He then began a systematic investigation of these conditions, and a surprisingly large percentage was found in favor of these restorations. It was through work of that kind that Dr. Black gained his ground. It was not given him to originate all these ideas or to originate the truth. As I said before, the truth concerning this has always existed, but it was revealed to him as a result of his years and days and nights of patient, painstaking investigation, and he noted the conditions found and condensed them to a system that he could teach us.

Nobody reveres the memory of the men we have spoken of more than I do, but we must give somebody the credit, and that is why we speak of the "Black method," because he advanced this system. That is all we contend for, and I have heard Dr. Black express himself to that effect many times; we do not wish to detract in the slightest degree from the honor due to these great men.

A great deal has been said about the terrible irritation of the gingival margin,

but if the restorations are finished correctly, so as to prevent further irritation, pleasing results may be expected; while if ragged, overhanging edges are left, no such results can be expected. I have seen cases in which there was more filling material in the interproximal space and under the margin of the gum and pressed up into the concavity of the tooth than was used in the making of the filling. What can be expected from such conditions as that?

I would also emphasize that we do not make such extensive extensions as we are charged with. In an article published in the April *Cosmos*, it was stated that the advocates of Black's method cut away one-third of the tooth. No one who understands Dr. Black ever cut away in wholesale manner one-third of the tooth. Therefore that statement, I trust, was due to ignorance of the conditions, and was not a wilful misrepresentation.

There is little else to say in closing the discussion, except that I am sorry that I could not show the slides that I brought with me to illustrate the paper.

The next order of business was the reading of a paper by Dr. J. J. MOFFITT, Harrisburg, Pa., entitled "The Treatment and Filling of Root-canals."

The paper here follows:

The Treatment and Filling of Root-canals.

By J. J. MOFFITT, D.D.S., Harrisburg, Pa.

THE subject of root-canal treatment and filling seems to be as important as any within the field of dentistry, because the stability and continued usefulness of the teeth depend on the condition of their supporting roots.

A tooth with a vital pulp is more stable and durable than one in which the functions of the pulp have ceased, and therefore it is our stringent duty to see to it that it never, through negligence on the part of either the patient or the dentist, becomes so afflicted;—but this does not come within the scope of the subject we are considering. Neither can we, in this limited time, take up a history of the treatment and filling of roots and the evolution that has brought us to our present knowledge of this branch of our profession, interesting though it be.

VALUE OF NATURAL TEETH IN THE PRESERVATION OF HEALTH.

We all know the ancient stories of worms in the teeth, and of incantations for odontalgia, with other evidences of ignorance concerning the dental structures that do not antedate us by so many years. We know also that the turnkey and the forceps were invented and employed long before excavators and broaches, from which we may conclude that the world's best thought has been given to other sciences—such as law, art, music, philosophy, etc., for a thousand years, and the men of learning engaged in these sciences have been dying, prematurely spent, because none of them gave attention to the science of supplying their bodies with nourishment. The mass of the people today, and the ma-

jority of physicians and dentists, do not appreciate the incalculable value of the natural teeth as factors in the nourishment and preservation of the individual. When a permanent tooth is gone, it is gone for good;—so much surface for grinding is lost every time the jaw is closed in mastication; so much area for pushing saliva through the food is lost every time the teeth are brought together; so much more unconverted starch and imperfectly masticated food is conveyed to the stomach to be disposed of; so much earlier the perfectly adjusted mechanism of the economy is broken up. Who can determine the value of a tooth, when upon it depend not only personal appearance, facility of expression, and healthfulness, but length of life itself?

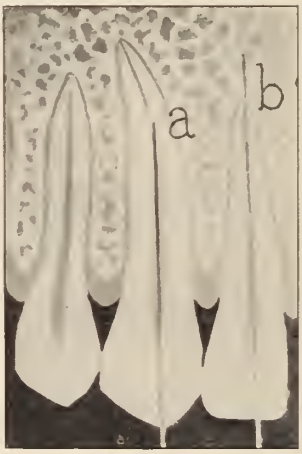
ENCAPSULATION OF ROOT-APEX THE OBJECT OF ROOT-CANAL FILLING.

When we undertake the filling of a root we must have in mind, first, a certain object to be attained; and second, a definite course of procedure to be employed during the operation. The first of these, the object to be attained, is the *encapsulation of the apex of the root** under consideration, so that any portion of it that is not in vital relation with the surrounding tissue may be separated from and rendered unirritating to the surrounding parts. Then the repair process will go on uninterruptedly, and the stability of the root be assured.

Encapsulation of the apex explains the durability of certain cotton root-fillings, long after the virtue of their medication had departed; of suppurated roots that give no trouble as long as gases find other exit and do not force the capsule; of teeth devitalized by concussion that cause no discomfort, and of the permanent success of surgically correct treatment and filling of root-canals.

Radiographs are indispensable in expert root-canal treatment and filling. They can be completed in less than ten minutes (see *Dental Cosmos,* August 1912, p. 868), and save many hours. The operator should not attempt to discover the length of the root by prodding

Fig. 1.



the apical tissue with a broach to see if he can feel the end of the root or produce sensation outside the foramen.

Sometimes a little pulp tissue left in a long root (see Fig. 1, a) reacts like the tissue outside an apex; sometimes in a short root (see Fig. 1, b) with a large foramen the tissue outside reacts like remaining pulp.

No instrument should ever be used for work about the apex of a root of which the operator could not be certain that it would give a negative result in a control culture.

* See *Dental Cosmos,* December 1911, vol. liii, p. 1418.

CONDITIONS INTERFERING WITH THE ENCAPSULATION OF A ROOT.

There are five conditions that may interfere with the encapsulation of a root, which for the convenience of consideration in this paper have been divided as follows:

(A) Infections from unsterilized instruments, or from instruments that have been sterilized but have touched the bracket, the lips, or adjacent teeth before being inserted into the root-canal, or that have passed through the septic matter remaining in the root-canal or from proliferation, and growth through the apex, of germs remaining in the root-canal.

(B) Pressure necrosis from gases forming in the pulp chamber that have not sufficient external exit.

(C) Eschars from too strong drugs having been forced through the apical foramen by too tight dressing or by compressed air under the temporary filling.

(D) Too short a root-filling, permitting serum to enter the apex and decompose within the root-canal.

(E) Too long a root-filling, a broken-off instrument point, or other projection, causing irritation of the parts outside the apical foramen and permanent interference with the formation of the capsule.

CONDITIONS DETERMINING METHODS OF TREATMENT.

Having in mind the object to be attained and these five conditions that may interfere with it, we will next determine the course of procedure to be employed during the operation. There are five conditions here also that determine the differences that should be made in the methods of treatment. This is not a complete classification, and like the former simply serves for the present consideration:

Class I. Exposed pulp with no infection.

Class II. Exposed pulp with infection not reaching the apex.

Class III. Root infection extending beyond the apex, with the pericementum not involved. This class has three subdivisions to be mentioned later.

Class IV. Root infection with destruction of the pericementum about the apex.

Class V. Puncture of the pulp chamber or root.

When a tooth is presented to us for treatment, we may determine, first, which of these classes (as denoted by numbers) it comes under; then we follow the course of procedure indicated in this class for inducing the formation of the retention capsule, bearing in mind and avoiding the five conditions (as denoted by letters) that interfere with this process.

We will now consider in turn the variations in treatment determined by these different conditions, our purpose being to induce encapsulation of the apex, and our technique being devised to guard against the five errors that would defeat this object.

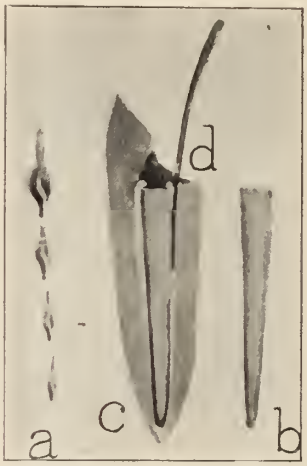
I. EXPOSED PULP WITH NO INFECTION.

Since the addition to our resources of the hollow inlays, pulp capping has been more successful than previously. It belongs logically to this first class, but will not be discussed in this paper. Assuming from the patient's history, or because

we need anchorage for a bridge, or for some other reason, that the pulp under consideration must be removed: First, a radiograph of the case is made in order that full knowledge of the shape and number and length of the roots, or of any other condition bearing upon the operation which the radiograph may disclose, may be obtained by the operator. All necessary instruments are in readiness. An assistant or attendant marks all bristles and broaches with the length of the root. Nitrous oxid and oxygen are administered nasally by an assistant. In order to avoid dropping the cocain or loss of time in placing it, a cone-shaped piece of gutta-percha previously fitted to an instrument and shaped so as conveniently to reach the exposure is warmed in such a manner that the point alone is softened. With this some cocain crystals are picked up (see Fig. 2) and pressed quickly against the exposed pulp, the bulk of gutta-percha of the cone preventing leakage and insuring pressure. This is done just as the analgesia stage is reached, twenty to forty seconds after beginning the administration; the nitrous oxid is shut off, and a few inhalations of oxygen are allowed, during which the broach is inserted and the pulp removed. It is best to drill the root-canal to the size desired for a filling at once, using the largest drill first so that more room is available for the work, then the drill next in size, then the third largest, and finally the fourth (see Fig. 3, a). The drills used should be round-pointed, so that the walls of the canal may not be cut into (for absolute smoothness is necessary), and flexible for following the curves, and the operator's touch must be light and skilful, for the technique of successful root-canal treatment and filling is as exacting and should be as expertly performed as a similar proceeding in any science where a moment of indifference may cause

Fig. 2.

Fig. 3.



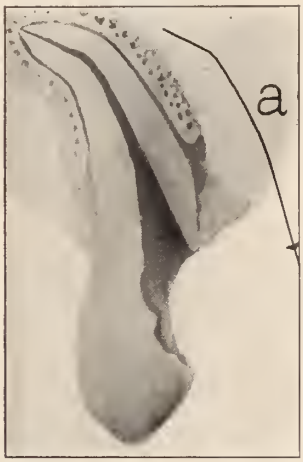
The space between root-filling and apex is exaggerated to show how the cold end of the gutta-percha prevents pressure on the zinc oxid paste with which the space is filled. Encapsulation then seals the apical end of the root, the other end being sealed by the process described.

failure in result. Any portion of the root that cannot be safely reached with a drill is cleansed with a broach.

By using each one of the four drills in the order mentioned for about one-fourth the length of the root, a uniform taper is given to the canal, and furthermore the membranes and loose tissues that impede the progress of drugs toward the apex, and which also lessen their efficiency, are thus early removed. When the curve in a root as disclosed by the radiograph (see Fig. 4) makes access to the apex impossible through the ordinary opening, the tooth should be cut in such a direction that access may be gained (see Fig. 5). If the curve in the root is so great that the apex cannot be reached when the opening has been brought to the gingival line, the remaining portion of the root beyond the curve must be treated by means of a steel bristle bent by aid of the radiograph (see Fig. 5, a) or a fine silver probe, together with the adhesive property of certain medicaments. The root-canal is next treated with an oxidizing or bleaching agent until all organic matter is removed. It is then washed out and dried. A gutta-percha root-canal filling (see Fig. 3, b) has meantime been prepared by the assistant, the length of which is determined by the radiograph, and the diameter by the drills that have been used. This gutta-percha point, after having been fitted fairly accurately to the root-canal, is immersed in 70 per cent. alcohol and dried. A paste is then made of medicated zinc oxid (or a commercial preparation called "pustolene"), which, having been brought to the proper consistence, is pumped into the tooth to the apex by means of a *measured* and *marked* broach. An assistant having coated the gutta-percha point with the same paste, the root-filling is pushed into place cold (see Fig. 3, c) in such a manner that the excess of paste comes out around it. A fine silver root-canal drier is placed in the root and pushed up between the gutta-percha and the side of the root-canal about half the length of the root, and the current is turned into it until the outer half of the gutta-

Fig. 4.

Fig. 5.



percha point is softened (see Fig. 3, d). The outer part of the gutta-percha point being thus softened is pressed tightly

Fig. 6.

into place and the root is sealed. Warm air from the syringe is also frequently employed, care being taken not to soften

Fig. 7.

the entire point, as the cold end at the apex serves as a stopper to prevent pressure through the foramen. The excess of zinc oxid (see Fig. 6) is wiped out, and all traces of it within the pulp chamber are removed with alcohol. An additional piece of gutta-percha may then be added to the root-canal filling if desired (see Fig. 7). Restoration of the remainder of the tooth is completed according to the requirements of the case (see Fig. 8).

Applying to this procedure the five conditions that may prevent encapsula-

Fig. 8.

In this case restoration is completed by baking a reinforced occlusal edge to a facing, fitting it to the broken tooth with wax, and casting the wax support in gold. The facing had an imitation porcelain inlay on its mesial surface, and the appearance of a gold filling distally, done with china paints.

tion of the apex, we have avoided the infections that may occur under A. Division B is not applicable to this class, there having been no gas formation in the pulp. Regarding division C, we have, by noting measurements of the root as shown by the radiograph, carried no drugs beyond the apex, and have avoided such pressure as would force them through the foramen, thus avoid- an eschar outside the root. Regarding

divisions D and E: By placing the cold gutta-percha point in the root with an exact knowledge of the length of the root and the point, we know that there has neither been a discrepancy in the length of the filling nor a projection of the filling outside the root. Having thus systematically and scientifically completed our operation, we have the satisfaction of knowing that we have not relied upon chance or experiment or the healthy organic nature of the patient, but have accomplished a scientific operation of assured success even in patients of low vitality.

II. EXPOSED PULP WITH INFECTION NOT REACHING THE APEX.

The second condition determining the method of procedure in the treatment and filling of root-canals involves cases where the pulp is exposed and infected, the infection having not reached the apex (see Fig. 9). A growth of micro-organisms, the presence of their products, the disintegration of the pulp tissues, and the attendant congestion of the bloodvessels, all unite to prevent the absorption of cocain, so that an attempt at pressure anesthesia may be extremely painful. A radiograph is first made of the case to disclose the necessary conditions and measurements, as mentioned in class I. In this class anesthesia with nitrous oxid and oxygen is carried just to the point of unconsciousness. The five conditions (represented by the lettered divisions) unfavorable to encapsulation being carefully observed by the operator throughout the operation, the pulp is removed just as complete anesthesia is reached; the attendant at the same time turns on the oxygen. The removal of the pulp is in this manner accomplished with no pain or inconvenience to the patient, and with no danger of forcing the infection to the apical area—which is sometimes the case when pressure anesthesia is used. The most important of the five conditions to be guarded against in this class is found in the first, or division A, viz, the danger of carrying the infection in the pulp to the apex by means of the instruments used in removing the pulp and in subsequently preparing the root-canal. This is guarded against by having the assistant make limit marks on all the broaches and bristles with the aid of the radiograph before the patient is anesthetized, thus enabling the operator to so control them that they will always fall short of the apex. As soon as the pulp is removed, the root-canal is sterilized to the apex so that any remaining infection is destroyed. It is even better in this class, when the condition permits delay, to prepare the tooth the day before the operation is made, by placing a cotton pellet containing a penetrating germicide—that is, one that will not cause coagulation of the tissue—loosely against the exposure. This cotton pellet containing the antiseptic should be protected from pressure with a piece of thin metal plate sealed in with gutta-percha. A hole is punched in the plate and a bristle inserted touching the cotton pellet (see Fig. 9), around which the gutta-percha is packed, so that, when the bristle is withdrawn (see Fig. 10), an escape for any gases from the pulp is afforded, while any infection entering from the mouth is rendered harmless by the sterilizing agent on the cotton pellet. Thus the conditions listed under B and C are avoided. In the few cases of this class not taking kindly to nasal inhalation, either owing to chronic mouth

breathing or nervousness, the pulps may be devitalized with one of the prepara-

Fig. 9.

tions of arsenic, always under protection of a metal plate to prevent pressure.

Fig. 10.

When the pulp is removed and the canal sterilized, the operation of root-filling is completed as described in class I.

III. ROOT INFECTIONS EXTENDING BEYOND THE APEX WITH THE PERICEMENTUM NOT INVOLVED.

This class is divided into three subdivisions: The first, with no pus present; the second, with the formation of pus begun; the third, with the presence of pus with fistulous opening.

Subdivision 1: *No pus present.* The pulp being destroyed by bacterial action, there is no need of an anesthetic in any subdivision of this class. A radiograph is first made. The canal is cleansed with no attempt to pass beyond the apex, and every precaution is taken to avoid carrying any of the matter within the tooth through the apical foramen. When the root is thoroughly cleansed, a cotton dressing twisted on a bristle is made, and, being saturated with a non-coagulating and sufficiently permanent antiseptic, is inserted so that it will reach as close to the apex as possible. This dressing must not be packed in, but lie loosely along the root-canal, thus avoiding the danger listed in division C, of eschars from too strong drugs being forced through the apex. A pellet of loose cotton is next placed in the pulp chamber, touching the end of the root-canal dressing and taking up any of the excess antiseptic that may have flowed down from it. The cotton is then touched with a little more of the antiseptic, until it is just moistened, leaving no excess. A valve is then made with thin metal plate as described in class II (similar to the valve in Fig. 10), permitting any pressure from within to escape, but no infection from the mouth to enter. This dressing is allowed to remain for a week or more, when it is removed and the root is washed with

alcohol. The root may then be enlarged and prepared for filling, with no danger of adding to the infection beyond the apex—which will usually have been removed by the blood, since the source of its activity is gone—and the filling is inserted as before described.

Subdivision 2: *Pus present.* When pus is present the root is sterilized and an opening made at once through the apex. Sterilizing agents or strong antiseptics are contra-indicated in the cancellated structure outside the apex. The pus tract, after having been evacuated, is washed with an antiseptic just strong enough to temporarily inhibit bacterial proliferation. A root-dressing is then made, similar to the one described in subdivision 1, but containing the mild antiseptic just mentioned for washing out the pus tract. The pellet of cotton in the pulp chamber beneath the valve may be saturated with a stronger antiseptic to destroy any infection entering from the mouth. This dressing must be changed every day for the first week, and for the remaining two weeks should be changed according to the indications given by the drainage on the cotton dressing. It takes about three weeks for the destroyed area outside the apex to be filled up with fibrous tissue, in which ossification afterward may or may not occur. If the root is hermetically sealed, the drainage from the process of repair will back up and prevent its progress. When there is no further need of drainage, the root-filling is inserted as described before.

Subdivision 3: *Involvement of the tissue beyond the apex with fistulous opening.* All traces of septic matter must first be removed from the root-canal, and the canal thoroughly sterilized; the apex is then opened, and the tract well flushed with a mild antiseptic. This is best accomplished by drying the tooth and packing the metallic point of an abscess syringe into it with gutta-percha, the point having been bent in such a manner that the syringe may be refilled with a medicine dropper. Sometimes the syringe may be refilled, and pressure supplied with the compressed-air spray. The tract should be washed out twice a day, and in the meantime a cotton dressing containing the mild antiseptic solution should be inserted, with a provision for drainage as before described. This antiseptic solution should be no stronger than 70 per cent. alcohol, as that is the greatest strength of the ordinary antiseptic solutions that will not interfere with penetration by causing coagulation. The dressing inserted in the root permits drainage of the abscess tract so that the fistula and the abscess tract both heal up at nearly the same time, and when the fistula has entirely disappeared, and the dressings within the root indicate no further need for drainage, the root-canal is filled, particular care being taken (with the aid of the radiograph measurements) to have the end of the gutta-percha root-canal filling fill the enlarged foramen completely and without protruding.

IV. ROOT INFECTION WITH DESTRUCTION OF THE PERICEMENTUM ABOUT THE APEX.

This condition is disclosed by the radiograph (see Fig. 11). No matter whether there is a fistulous opening or not, in nearly all cases amputation of the apex must be resorted to before the abscess can be healed, except perhaps that autogenous vaccine treatment may be resorted to—which, however, is as yet too

little known. In amputation of the apex, the root-canal filling is always inserted

Fig. 11.

prior to the operation (see Fig. 11). The root, having been first thoroughly sterilized, is treated as in other classes.

Fig. 12.

Incision so sloped that serum will not stagnate about apex.

The opening for the amputation and the amount of apex to be amputated are determined with the object of establishing unobstructed drainage (see Fig. 12), the measurements for which are made with the radiograph. Any necessary curetting of the bone is done with a large round bur that is properly sterilized. The tract is then washed out with a mild antiseptic solution, and drainage is maintained by cotton or gauze containing the same solution, which will not prevent the formation of reconstruction tissues, but is inhibitory to bacterial action.

Fig. 13.

This dressing should for several days be changed twice a day and the patient be instructed to sleep so that drainage will be facilitated.

V. PUNCTURE OF THE WALL OF THE ROOT-CANAL.

This condition may have two subdivisions—the first (see Fig. 13, a) being abscesses caused by a puncture or by drugs or instruments passing through the puncture; the second subdivision (see Fig. 13, b) being abscesses at the apex of the punctured root due to pu-

trescent matter that was not removed from the part beyond the puncture. In subdivision 1 the apex of the root has already been encapsulated, and no trouble can occur from it. The fistula is usually present in each of these subdivisions. In subdivision 1 the fistulous tract is washed out and the puncture closed, either by making a wax impression of the interior of the root, which is then cast in gold and is inserted with chloro-percha, or by placing a little cement at the side of the puncture (see Fig. 14), after having dried the root thoroughly, and inserting in this the edge of a piece of platinum foil cut sufficiently larger than the puncture. When the cement is set, the platinum and the adjoining root-canal are thoroughly sterilized with 70 per cent. alcohol and then dried with warm air; then the platinum is burnished down over the opening and sealed in with a layer of cement (see Fig. 15). When the cement has hardened, access to the apical portion must be obtained with the aid of the radiograph, and the treatment carried on as in class II, care being taken not to puncture the encapsulation which was permitted to form, because there was always drainage through the puncture. When this is accomplished, the root-canal filling may be inserted, and the condition will soon heal up and the fistula will disappear.

In subdivision 2, where the abscess is due to putrescent matter remaining in the part beyond the puncture (see Fig. 13, b), access must be obtained to this apical portion with the aid of the radiograph, and the treatment carried on as in class III. Entrance to this apical portion of the root is more or less difficult, because instruments have been passing through the puncture and will have a tendency to continue doing so. The old root-canal filling will sometimes be found outside of the puncture, having been placed there with the supposition that it was in the root. This mistake is made by using too strong drugs in the root-canal, the puncture having been accidentally caused at the portion where the root has a sudden curve, and too strong medicaments used in the root-canal and

Fig. 14.

Fig. 15.

passed out through the puncture. By their escharotic action these drugs have destroyed the sensitivity of the tissue outside, and have led the operator to believe that he was working inside the root-canal (see August 1912 *Dental Cosmos,* p. 873, Fig. 15). Inserting a filling in this tract outside the root-canal caused inflammation, and the need of drainage established a fistulous opening, so that, in treating these cases, the remaining pieces of the misplaced filling must be sought for by the aid of the radiograph and removed.

When the upper end of the root is finished, the apical portion is filled. The puncture is closed afterward as before described, for the presence of the cement, if platinum is used, or of the gold casting, if this method of closure be employed, will prevent ease of access for the treatments sometimes necessary in class III. After the apical portion is filled and the puncture closed, the remainder of the root is filled. Fistulous openings caused by either of these subdivisions will close up at once when the condition is corrected. A very large puncture in the pulp chamber should be covered for several weeks with platinum foil held in place with gutta-percha, until the tissue has grown firmly against the platinum and established a membranous layer that will not bleed. This must be done with all antiseptic precautions. After about three weeks the gutta-percha and platinum foil may be carefully removed and a soft wax impression made of the punctured portion, which when cast with pure gold makes an efficient covering. The root-canal openings must, of course, be preserved in the gold. Great care must be taken not to push cement or chloro-percha into the membranous covering of the tissues outside of the root, or an irritation will be set up which will defeat the operation.

When a puncture in a root is inaccessible for closing, and the remaining portion of the root is too difficult of entrance for treatment, the root is filled to the puncture with the root-canal filling previously described in cases for amputation, and is amputated at the puncture.

COMPLICATED CASES AND TREATMENT.

There is an additional condition that may be encountered in any class when a

Fig. 16.

badly broken down tooth is involved with suppuration of long standing in the canals, with a bad history, or in certain other difficulties (see Fig. 16). A radiograph may not be available, or an infection beyond the apex may not have progressed sufficiently to be discernible, or there may be so tortuous a root that a satisfactory root-filling is impossible with every aid. We cannot be sure that our treatment is successful, and we hesitate to fill such a tooth at once for fear of future trouble. Temporary fillings with so large a masticating surface pack down,

and sometimes exert force through the apex, causing pressure necrosis, or eschars from drugs, and they sometimes fracture the tooth or destroy the attachment of the gingival tissues, and add to the liability of inflammation or food impaction. All this may be avoided, and all hesitation about filling such a tooth may be ended by the following method:

Preparation for a gold casting restoring the original contour of the tooth is made. When the wax form for this is hollowed out with the suction carver and in readiness for investing, a hole is made in its occlusal surface, through which the roots can readily be treated. After casting, an impression of this hole is obtained and a casting made to fit it. This plug is put in place in the filling, and the combination articulated and polished, after which the plug is fastened into the filling with base-plate gutta-percha. The root is then filled as before described, the zinc oxid being inserted as near the apex as possible with a fine silver probe. The contoured gold filling is completed and set with cement (see Fig. 17). If trouble occurs, a little heat will remove the core (see Fig. 18), and access to the root-filling may be had without destroying the contour of the tooth. This form of root-filling, too, is readily removable, is the best kind of dressing that can be put into a root, and becomes a permanent root-filling whenever the apex is encapsulated.

Fig. 17.

Fig. 18.

In my opinion root-canal fillings made in the manner described in this paper are preferable to any other form, although success is just as certain with other methods in the hands of careful and skilful practitioners.

ADVANTAGES OF GUTTA-PERCHA.

Gutta-percha treated with solvents loses considerable of its toughness, and when dried is somewhat weakened in structural quality; and, though strength is not needed in a root-canal filling, to my mind gutta-percha softened by heat in the manner described and then pushed into place and carefully sealed is impervious to any deleterious conditions that may arise. Furthermore there is no danger of pushing any of the root-canal filling through the apical foramen

if the gutta-percha be inserted cold, having the apical end solid and of known length, so that when it stops at the apex we know it has gone no farther than was intended. There can be no danger of the filling either falling short of the apex or protruding beyond it. Root-canal fillings that cannot be removed at will should never be inserted in roots, as there are times when it is necessary to remove them, and it not only is less difficult and less painful, but also it cannot endanger the future of the tooth, if the fillings are constructed in the beginning with the provision that such a necessity may arise.

VACCINE TREATMENT.

It is well known to bacteriologists that in the kind of infections with which we have to deal, to insure complete success autogenous vaccines should be used—for vaccines made from germs obtained from other sources will not give as successful results as those made from the germs taken from the individual case to be treated, even though the variety of germs in each case be the same. Some germs found in the teeth cannot be grown as yet in artificial media. Conditions occurring from them can have no autogenous treatment; nevertheless, since I have seen stubborn and obstinate cases of abscess in the antrum that were originally caused by diseased teeth, cured by the autogenous method after twelve years' resistance to all other methods of treatment, it is probable that this treatment will be of great service to us in the near future.

CONCLUSION.

The theory on which this method is based is that we must restore artificially only the parts that cannot be restored by nature (dentin and pulp). and cause no impediment to the natural processes nature is equipped to employ in the restoration of the surrounding tissues.

The illustrations are made from colored charts and are not so descriptive in black-and-white. They are designed to show the conditions described, and are not supposed to be anatomically correct.

No drugs or medicaments are mentioned, but each operator, judging by the conditions and requirements presented, may choose them from his own knowledge of materia medica and therapeutics, which is the only way in which medicaments should be employed.

Painstaking care is of the utmost importance in the treatment and filling of the root-canals of teeth. When a tooth has arrived at the stage where it needs such treatment, it is in danger of being lost. Its crown, in which its actual usefulness is located, is more or less damaged and in need of careful restoration by large fillings or an artificial crown, or must be preserved in order to serve as an abutment supporting a bridge. These restorations are of the utmost importance for the patient in retaining the efficiency of his masticatory surfaces, and they can be made only with untiring and skilful labor on the part of the operator. Therefore the supports to which they are attached, the foundations of their usefulness, must be of certain and lasting durability in order that our painstaking labor may not be in vain, and in order that our patients may be served to our utmost capabilities in the preserving of their appearance, facility of expression, comfort, healthfulness, and even length of life.

There being no further business before Section II, the chairman, Dr. Hetrick, declared the section adjourned *sine die.*

SECTION III:

Oral Surgery, Anatomy, Physiology, Histology, Pathology, Etiology, Hygiene, Prophylaxis, Materia Medica, and Allied Subjects.

Chairman—W. H. G. Logan, Chicago, Ill.
Vice-chairman—E. E. Hall, Columbus, Ohio.
Secretary—T. P. Hinman, Atlanta, Ga.

WEDNESDAY—Morning Session.

The first meeting of Section III was called to order by the chairman, Dr. W. H. G. Logan, Chicago, Ill., on Wednesday morning, September 11, 1912.

The first order of business as announced by the chairman was the reading of a paper by Dr. J. F. Biddle, Pittsburgh, Pa., entitled "Diagnosis and Treatment of Important Diseases of the Dental Pulp," as follows:

Diagnosis and Treatment of Important Diseases of the Dental Pulp.

By J. F. BIDDLE, D.D.S., Pittsburgh, Pa.

The rational diagnosis and treatment of pathological conditions of the dental pulp is one of the fundamental branches of modern dental practice. While the profession has had its several spasms of enthusiasm over various operative procedures in recent years, we must recognize the fact that the success of any of these operations is absolutely dependent upon the healthy condition of the tooth-root. In view of the marvelous strides that have been made in the restoration of tooth structure, operations which a few years ago would have been deemed impossible, it is apparent that more definite and exact methods of pulp

treatment must be devised, if this important division of our work is to rank with the more purely mechanical.

From the pulp and its disorders arise many pathological conditions, due, no doubt, to the fact that the pulp is one of the few tissues in the body that have retained the original, embryonic form. It is soft and gelatinous, and therefore easily attacked by the micro-organisms of the oral cavity, which may be transmitted to it through the dentinal tubuli, the apical tissues, or by direct exposure. In order to diagnose and treat intelligently diseases of this delicate and important tissue, one cannot emphasize too strongly the value of a comprehensive knowledge of anatomy, physiology, histology, and pathology, and its conscientious application to each case that comes under our observation. How often one is prone to treat mechanically, rather than thoughtfully and logically, the individual needs of his patients.

The diseases of the dental pulp that we shall consider are hyperemia, inflammation of the pulp, suppuration, and chronic inflammation.

HYPEREMIA.

Hyperemia is divided into two classes, active and passive. The many circulatory and infective diseases of the pulp are attributable, no doubt, to its lack of lymphatics, and the peculiar character of its structure. For this reason any irritation of the pulp often produces hyperemia, with a distension of the arteries, capillaries, and veins, and if the apical foramen be small, the pressure of the enlarged arteries upon the weaker veins prevents the free circulation of the blood, thus resulting in a passive as well as an active hyperemia. Of the active hyperemic cases, such only will be considered as relate to the destruction of the pulp, as this paper deals with destruction, not conservation, of the dental pulp. In the diagnosis of such cases let us consider causes, viz—

Direct. The irritation of the pulp through thermal stimuli, due to defective enamel or dentin, or the presence of a large metallic filling in close proximity to the pulp.

Indirect. Injury or disease of the apical tissue. A blow or other injury to the teeth.

In cases where a sharp, acute pain is produced by contact with hot or cold substances, recurring only in response to direct stimuli, the symptoms are favorable under proper treatment. Paroxysms of sharp pain, varying from a few seconds to a few minutes, are indicative of a serious disturbance of the circulatory vessels of the pulp. The pain from a hyperemic pulp is not always referred to the affected tissue, but is often reflected to the ear, temple, infra-orbital foramen, the malar prominence, the angle of the lower jaw, the side of the neck, or other remote part of the affected side. Cold water applied to the offending tooth will usually produce an aggravation of the reflex neuralgic pain, as well as pains in the affected tooth. For relief, the cavity is rinsed with warm water, the carious dentin, as far as possible, is removed, and an anodyne treatment of oil of cloves and chloroform, equal parts, applied for a few minutes, repeating if necessary. The pulp when exposed usually presents a purplish hue, and on account of the enlargement of its vessels immediately protrudes slightly through the opening. Phenol is now applied and the pulp is punctured with a sharp probe, permit-

ting the escape of blood for some time, after which it is destroyed. In diagnosis of hyperemia, one must bear in mind that the severity of the disorder depends upon the vascular disturbance, henee is often simply a matter of differentiation, distinguished mainly by therapeutic tests, on account of which one must discriminate carefully between this disturbance and other pulp disorders. The location of a hyperemie pulp is not always indicative of its cause, as the following example will demonstrate: A partially impacted lower left third molar was removed from the jaw of a woman about thirty-two years of age. It was necessary to bur and chisel away the occlusal half of the process before attempting the extraction of the tooth, which was accomplished only after great difficulty. Two days later the patient returned, complaining of the condition of the first molar, which was highly sensitive to thermal changes. A careful examination revealed a hyperemia in this tooth, due to no apparent cause, except possibly to a reflex pain from the third molar region. The tooth was isolated, washed with alcohol, and received several coats of resinous varnish, usually used as a cavity lining. Next a loose-fitting band of exceedingly thin German silver, filled with gutta-percha to form a crown, was pushed into place, and the patient instructed to remove a partial upper plate which occluded with the offending tooth. The gutta-percha cap was removed after five days, during which time the socket that had contained the third molar was irrigated daily with warm, normal salt solution. Thermal tests were applied to the first molar, which was found to be in normal condition, the irrigation of the third molar socket having relieved the irritation due to the reflex action of its torn circulatory vessels.

INFLAMMATION OF THE PULP.

By its symptoms only, inflammation of the pulp cannot be differentiated, positively, from hyperemia, for the reason that inflammation usually involves hyperemic conditions, although in inflammation the pain is more lasting, frequently occurs without apparent cause, and is greater after exertion, mastication, and lying down. During the first stages of inflammation the pain is dull and heavy, with uneasiness about the jaws and inordinate response to thermal stimuli, particularly to heat; while in the latter stages the pain is of a severe, continuous nature, the pericemental membrane becomes somewhat hyperemic, and the tooth responds to percussion. Reflex pains also are noted. In making a diagnosis one must remember that there is seldom true inflammation of the pulp without its exposure, although extensive bacterial invasion may occur by the micro-organisms or their products through the dentinal tubuli. The causes should be carefully considered, whether they be extrinsic, such as are due to the pulp's exposure by deeay, deep-seated cavities, the action of irritating drugs, large metal fillings, mechanical violence in the form of accidents or dental operations, an abscess on an approximating tooth, pyorrhea pockets, or impacted teeth. The intrinsic or direct causes may be pulp nodules, injury to the vessels at the apex of the root, thrombosis, etc. If there be any doubt regarding the identity of the affected tooth, each tooth of the affected side should be isolated and thoroughly tested. The electric mouth-

lamp and the X ray are often valuable diagnostic aids. The prognosis in pulpitis is bad; invariably the pulp should be removed.

Treatment. Excavate the cavity of decay as thoroughly as possible. Apply an anodyne treatment, repeating if necessary, after which arsenic may be introduced. One must be sure pulpitis has subsided before the introduction of arsenic, otherwise it acts as an irritant instead of promptly devitalizing. If danger of further irritation seems imminent an opening should be made in another part of the tooth for the introduction of arsenic through healthy tissue for the pulp's devitalization. Simultaneously the pulp may be quieted by sedative applications in the cavity of decay. In inflammation without decided hyperemia, the pulp may become inflamed, and go on to suppuration and final destruction of the organ without producing any symptoms whatever of inflammation or of hyperemia. Occasionally such trouble cannot be dissipated by the anodyne treatment, nor will it be quieted by cocain or arsenic. The writer has in mind one case which would not yield to treatment, and it was necessary to give the patient an anesthetic in order to remove the pulp. Two years later he returned with another tooth in the same condition, and which would respond to no known treatment. This time nitrous oxid and oxygen were administered for the operation.

SUPPURATION.

Suppuration of the pulp usually occurs from infection through the dentin, but bacteria or their products may enter the pulp through the circulation, if the systemic resistance be lessened during a period of bacterial invasion of any other part of the body. In ulceration of the pulp there is usually little if any response to cold, the discomfort being a dull, gnawing pain if the cavity of decay be open, but if closed, so that the pus cannot escape, intense pain results. If the pulp chamber be opened, the probe may be passed in for some distance, depending upon the extent of suppuration, before any sensation be felt, unless it be a pulp abscess, when it may be necessary to pass a sharp, slender probe into the pulp tissue, resulting in a bead of pus and immediate relief. In pulp abscess the pain grows in intensity, and, in contrast to the other conditions of suppuration, is often relieved by a cold application. In most cases response to heat stimuli is very marked, while in others it may decrease to such an extent as to be almost imperceptible. In the latter stages of pulp suppuration the tooth may become sore, due to the action of bacterial products upon the pericementum. The symptoms of pericemental disturbance may assume proportions of incipient acute apical abscess, although considerably highly inflamed but vital apical tissue exists. The differential diagnosis of these two conditions is highly important with regard to the patient's comfort, particularly since the introduction of formocresol, the use of which over vital tissue will inaugurate excruciating pain. Many phases of this condition may exist, as will be demonstrated presently by radiographs. Case 1 is an instance of a mesial root of a lower molar containing an abscess with apical involvements plainly discernible; secondary dentin had completely severed the pulp, entirely filling the body of the pulp chamber, while the distal root contained a vital pulp.

CHRONIC INFLAMMATION.

Chronic inflammation may result either in a sclerosis or an hypertrophy of the pulp. The hypertrophy is often of much greater bulk than the original pulp, and is composed of an inferior type of granulated tissue, hence it bleeds readily, and the absence of nerves permits the easy removal of its bulbous portion, thus permitting confirmation of the diagnosis that it is pulp, rather than gum tissue grown in through a cavity or through a perforation. The importance of correct diagnosis is apparent when one considers the matter of devitalization.

Pulp nodules are usually found in the coronal portion, although they may be found in any part of the pulp tissue, and may produce either hyperemia or inflammation. In the majority of cases they can be detected by the X ray, but their pathological significance is not such that it is wise to devitalize the pulp without confirmatory diagnosis by other means.

EXTIRPATION OF THE PULP.

The *modus operandi* of destroying a pulp is dependent upon existing conditions. If the pulp be suppurative, devitalization by arsenic is preferable, as its use sterilizes the contents of the canal simultaneously with its destruction of the pulp; but if non-suppurative, cocain or some form of cocain extirpation should be employed. Clinical observations have shown that infections frequently follow pulp extirpations with cocain, and have led to the conclusion that the principal cause was the indiscriminate use of the extirpation method. If the operator be in doubt as to the reasonably healthy condition of the pulp, he should invariably use arsenic, the after-results of which have proved uniformly satisfactory. The methods employed in the use of cocain are too well known to receive more than passing notice. They are—

(1) Cocain pressure with base-plate gutta-percha, usually deemed best for cases of direct exposure.

(2) Cocain with high-pressure syringe where the tooth be sound or the pulp be covered with considerable dentin.

(3) The method of injecting through the gum tissue in close proximity to the periosteum and anesthetizing the apical tissue is sometimes used. This method is the least desirable.

DEVITALIZATION BY ARSENIC.

The greatest objection of most practitioners to the use of arsenic is its production of pain. While arsenic is recognized as an irritant of pulp tissue, the writer believes that the greater part of the pain produced is due to faulty technique in cavity preparation and in the application of the agent. Very satisfactory results may be obtained by the preparatory use of an anodyne treatment from five to fifteen minutes immediately preceding the insertion of the arsenical paste. In a record of more than fifty cases which has been carefully kept, four had slight, intermittent pain during the first few hours, and two had severe pain—not sufficient, however, to necessitate the removal of the application. The arsenic should be left from one to three days, where there is an exposure or nearly so, and will very rarely require removal on account of pain. Occasionally an obstinate case presents which will not respond to the anodyne treatment, or devitalization, or to the extirpation method, and can be removed only after

resorting to the use of a general anesthetic.

It may be of interest to say a word here regarding the introduction of arsenic into teeth not fully formed. Recently such a case came to your essayist's notice. The patient was a boy fourteen years of age. The lower right first molar had been removed when the child was seven years of age, the second molar moving forward and occupying the exact position of the first molar. There was an exposure in an occlusal cavity, and the dentist, after a superficial examination of the supposed first molar, decided that the roots were sufficiently formed to insert arsenic with safety for forty-eight hours. Four days later the patient presented with the buccal and lingual sides of the gum showing a deep purplish color, the teeth exceedingly loose, the glands and side of the neck and face swollen. The tooth was immediately removed (Fig. 1), also the infected hard and soft tissue for a considerable distance; then the infected area was irrigated with normal salt solution and swabbed with 10 per cent. iodin. The patient was seen every day for a week. The glands and tissues returned quickly to normal condition with no further treatment except daily irrigation with warm, normal salt solution.

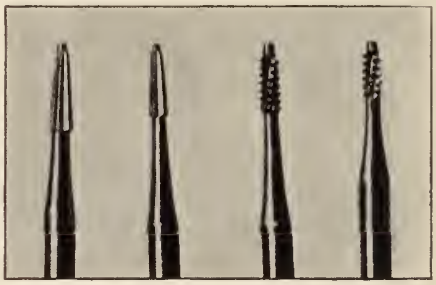
Fig. 1.

Lower second molar of boy of fourteen, in which arsenic has been used.

ROOT-CANAL TREATMENT.

For successful root-canal treatment it is essential that the pulp chamber be correctly opened in order to accomplish its thorough mechanical cleansing, observing the following rule: "The walls of the cavity, pulp chamber, and canals should be continuous, but not necessarily parallel or on the same plane." The pulp chamber is first opened with a round bur. The opening is enlarged with a small fissure bur, the end blades of which—and sometimes the edges of the side blades also—are removed, thus making it capable of enlarging the walls of the pulp chamber of a bicuspid or of a molar without marring the floor (Fig. 2) and changing the angle of approach of one wall of an incisor or of a cuspid without making pits in the opposite walls. In no case should the removal of the pulp be attempted until the cavity and the pulp chamber be thoroughly cleansed of all débris. The incisors and cuspids more frequently than the other teeth are insufficiently opened, their ideal opening being through the center of their lingual surfaces; but as

Fig. 2.



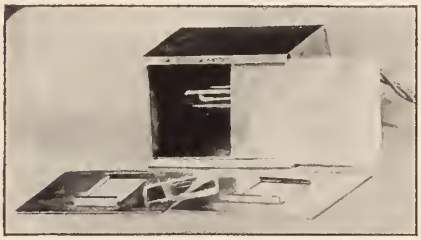
Specially prepared fissure burs for opening pulp chamber.

their cavities are generally on the approximal surfaces, the canal is usually opened from that angle. To facilitate the removal of the pulp, the "orifice of the exposure should be extended to the gingival wall and the full breadth of the chamber," frequently cutting a lingual extension, which will admit of free access of a broach to the lingual of the incisal edge. For the extension of the canal the small specially prepared fissure bur (Fig. 2) previously mentioned is used. The canal is approached from the same direction as a broach would be introduced, passing the bur into the canal, where its lateral cutting broadens the canal in such a direction as will straighten its approach, using great care to prevent the cutting of the opposite wall and the consequent roughening—which would result in making the canal impassable to the broach. In bicuspids the orifice should be made through the center of the roof of the pulp chamber, and then broadened bucco-lingually to expose the horns of the pulp, which in these teeth diverge toward the points of the cusps. Their root-canals are given off from buccal and lingual extremities of the pulp chamber, hence the cutting must be sufficiently wide to permit the insertion of an instrument. The radiograph has been found to be one of the greatest aids in the treatment and enlargement of root-canals. In difficult cases the writer places the film in an illuminating box, and keeps it before him on the bracket table during the entire operation, so that it may be referred to at all times without handling. This box has a shield for both horizontal and vertical films. (See Figs. 3 and 4.)

Fig. 3.

Author's illuminating box in operation.

Fig. 4.



Parts of author's illuminating box.

SUMMARY OF ESSENTIALS OF ROOT-CANAL TREATMENT.

To sum up, the essentials of root-canal treatment are—

(1) To establish and maintain an aseptic field of operation.

(2) Never to attempt the removal of a pulp until all cutting be done and débris removed.

(3) Instruments that have been used in the cavity of decay should never be used for the removal of the pulp.

(4) Instruments used in the canal of one tooth of a patient should never be used in the canal of another tooth of the same patient without their being sterilized.

(5) Instruments used in a canal of a multi-rooted, infected tooth should

never be used in other canals of the same tooth.

(6) Burs and drills should never be used to open root-canals.

PRIME IMPORTANCE OF REMOVAL OF ALL PARTICLES OF PULP TISSUE.

Before the advent of the X ray it was taken for granted that in the filling of a root-canal, when the patient felt pressure at the end of the root, the ideal result had been accomplished. This pressure is analogous to the action of the hyperdermic syringe. If one's finger be placed over the orifice of the syringe and pressure be created on its piston, the compression of the air in the syringe will produce pressure on the finger covering the opening. The same result occurs in the root, the apical tissue corresponding to the finger and the gutta-percha or other filling material to the piston of the syringe. The X ray has revealed roots two-thirds filled, or less, the filling of which was attended with slight or in some cases acute apical pain. The filling material introduced matters little, provided all particles of pulp be removed and the canal rendered sterile to the apex of the root. Judging from experience with the radiograph, the writer believes that thorough cleansing of the canal is much more essential than the filling of the root to its apex, although one should of course endeavor to do this also. However, contrary to all that has been said on the subject, your essayist has as yet failed to radiograph a single case—wherein the removal of all organic matter had been accomplished—that revealed any abscess, even though the roots had not been perfectly filled. But in cases where small quantities of organic matter remained, or where mummifying paste had been used, many blind abscesses were revealed.

STERILIZATION OF ROOT-CANAL INSTRUMENTS.

The testing and sterilization of all instruments entering a root-canal is one of the most important details in their treatment. For the purpose of sterilizing instruments, the writer uses a small glass dish divided lengthwise into three compartments. (See Fig. 5.)

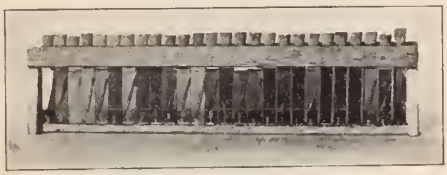
FIG. 5.

Author's sterilizing dish for root-canal instruments.

One of these parts is subdivided, thus making in all four compartments, two long and two short ones. Of the two longer compartments, one is used for smooth and barbed broaches and long-shanked reamers, the other for straight handpiece burs. One of the smaller compartments is used for right-angle burs and the other for short reamers with handles. This sterilizing dish is kept on the cabinet at all times. It has a dustproof, airtight cover, and does not permit the escape of the sterilizing agent, a 10 per cent. lysol solution, which is a saponified product of coal-tar. Lysol is a clear, brown, oily liquid containing 50 per cent. of compara-

tively pure cresols. Its effects are similar to phenol, but it is five times stronger and eight times less poisonous. Instruments will not rust or corrode in lysol solution from 2 per cent. up. The writer has made some lysol tests which have been standing since last December. (Fig. 6.) The first tube contains simply water, and shows considerable rust of the bur; the second tube holds 1 per cent. lysol, and there is very little rust; while in the remaining tubes, containing 2 to 25 per cent. lysol, no rust is present. The sediment in the tubes is due to the fact that unfiltered city water was used, thus causing the lime to be precipitated by the soap in the lysol. All instruments to be used in opening or penetrating the root-canals are placed in this sterilizing dish and allowed to remain until ready for use, when they are removed with pliers, placed in a watch-glass containing alcohol with which to rinse off the lysol, and then in a holder ready for use. After using them they are mechanically cleansed and replaced in the sterilizing dish, not to be removed until again needed.

Fig. 6.



Lysol test as described in paper.

USE OF THE X RAY IN DIAGNOSIS.

The X ray is of inestimable diagnostic value in dentistry, but in the past its use has been confined more to the discovery of chronic involvements of the apical tissue than to acute destructive conditions. While its value for these latter conditions has increased wonderfully, it still has decided limitations, and requires also a more exact technique, as the accompanying radiographs will illustrate.

In Fig. 7 the radiograph in the center depicts the filling practically the same size as the original, while the ones on each side were taken with the tooth lying in exactly the same position, but the tube was moved first three and one-half inches to the right, then three and one-half inches to the left, respectively, of the original position, and focused so that the rays from the tube were oblique to the bucco-lingual axial plane, not parallel with it as in the first instance, hence the distortion of the filling.

In the next illustration (Fig. 8), will be noted the distortion of the length of the tooth; the central figure, where the focus was direct or perpendicular to the

Fig. 7.

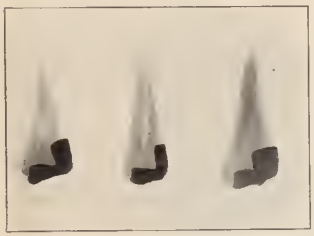


Fig. 8.

Fig. 9.

mesio-distal plane, reproduces the tooth of the same length as the original, while the oblique rays reproduce a distortion in the length of the tooth similar to that noticed in the filling.

Fig. 9 shows the correct opening of the canal of the cuspid, the easy insertion of a broach, and the canal filled.

Some of the most important uses of the X ray in this field of dentistry are found in the diagnosis of the following:

(1) Diseases of the pulp due to the presence of large metallic fillings.

(2) The presence of invisible cavities.

(3) The presence of pulp nodules.

(4) Diseases of the pulp due to the presence of impacted teeth.

(5) Deposits of secondary dentin.

(6) Abscesses on one root of a tooth, with vital pulp in others.

(7) To locate the number, position, and curvature of the canals of a tooth.

(8) To show the length of roots.

(9) To show success or failure of an operation in insertion of a root-filling.

Besides the foregoing, the X ray has at least fifty other uses in dentistry, the enumeration of which, time and the subject of this paper will not permit.

PRACTICAL CASES.

There will be thrown upon the screen a number of views illustrative of cases mentioned.

Case 1. The patient, a woman, fifty-five years of age, with a lower left first molar which exhibited slight soreness upon occlusion, also an occasional discomfort which the patient could not describe as pain but simply as an "uneasiness." Upon the removal of a large amalgam filling, it was found that the body of the pulp chamber was filled with secondary dentin, the removal of which, followed by the insertion of a broach in the distal canal, brought forth a protest from the patient, and a drop of pus from the mesial canals. A radiograph (Fig. 10) revealed an apical abscess on the mesial root of the first molar, a pericemental abscess on the vital bicuspid, also partially filled roots of the second

Fig. 10.

molar with resorption of the apical portion of the root.

Case 2. The patient, a man of thirty-five years of age, ten years before presenting had had a crown with a facing attached to it placed on the bicuspid. Seven years later, the patient noticed that the central and lateral responded to thermal stimuli. His dentist advised him that this condition would pass away, which it eventually did, but the result is apparent. About a month prior to the time when the radiograph was taken, a slight swelling appeared. An examination revealed a sinus between the first bicuspid and lateral incisor on the labial surface (Fig. 11, *a* and *b*). A radiograph was taken, after which the central, lateral, and impacted cuspid, with surrounding structure, were removed. Had the case been correctly diagnosed at the beginning of the hyperemic condition, doubtless both incisors could have been saved.

Case 3. The patient, a young woman of twenty, was suffering with spasmodic pains of about an hour's duration once or twice every twenty-four hours. The second bicuspid was badly broken down and was removed, but the pain continued. Thinking that possibly there might be some loose bone in the socket, as the process was splintered in the extraction of the tooth, the case was referred for a radiograph. The film (Fig. 12) reveals pulp nodules in both molars. With this discovery as a clue, the thermal tests were applied, with just sufficient re-

Fig. 11.

a

b

Fig. 12.

Fig. 13.

Fig. 14.

Fig. 15.

Fig. 16.

sponse to confine the diagnosis to the first molar.

Case 4. The patient, a man of twenty-eight, had a chronic abscess on the central and lateral incisors, with inflammation of the lateral, which is not surprising when one considers the extent of the abscess tract. (Fig. 13.)

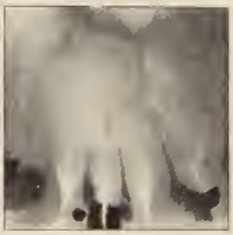
Case 5. The radiograph shown in Fig. 14, which was taken in a woman of twenty-six, is of peculiar interest, owing to the fact that it shows a deciduous molar with deposits of calculus (only the occlusal surface is visible through the gum); also an exposed, inflamed pulp, which the dentist was unable to locate, attributing the trouble to the supposedly partly erupted first permanent molar.

Case 6. The patient, a man thirty-five years of age, with an inflammation of the lower molars. The second molar contained a large contour amalgam filling of some years' standing; the third molar, a large approximo-occlusal cavity. Both teeth gave equal response to tests. The radiograph (Fig. 15) revealed the trouble to be due to the amalgam filling, which was removed. The pulp was devitalized and the root and tooth filled.

Case 7. The only manifestation of trouble in this patient, a woman of thirty-eight, was a swelling of the left side of the upper lip and the lower portion of the nose, which an examination showed to be due to a large deposit of bone. The X ray (Fig. 16) revealed the cause to be an abscess involving the

Fig. 17.

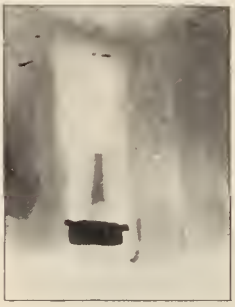
a



b

Fig. 18.

a



b

central and lateral incisors, which when opened were found to contain cotton root-canal fillings.

The next two cases are instances in which it was necessary to resect the roots in order to save the teeth.

Case 8. This case, that of a woman of forty, involved abscesses on both centrals, as well as the left lateral and left supernumerary, there being also three sinuses. The centrals were treated successfully with quick response, then the X ray (Fig. 17, *a*) revealed the condition of the lateral. The results ten

Fig. 19.

months later are noted also (Fig. 17, *b*); the cavity was then filled with bony tissue, with the exception of a small particle of bismuth, which is not as yet absorbed.

Case 9. This shows the longest section of root that the writer has ever removed with the hope that the tooth will eventually recover. The band surrounding the crown is so placed as to hold the tooth firmly until the cavity in the bone is filled, and the tissues (Fig. 18, *a* and *b*) are readjusted.

Case 10. This is illustrative of the proper root-filling of a central and a lateral incisor. (Fig. 19.)

Some of these examples are not within the scope of this paper, yet are indicative of the grave results of careless diagnosis and treatment of the dental pulp, hence should serve as an incentive to more careful and rational methods of investigation and diagnosis.

Discussion.

Dr. Arthur D. Black, Chicago, Ill. It has been a delight to listen to the essayist, who has dealt with a comparatively limited subject and has gone thoroughly into the details of operative procedure. I am very much pleased indeed to have the opportunity of discussing a paper of this type, even though it is so thorough in itself.

The history of pulp treatment in this country is interesting, and I want to refer very briefly to the general waves that have gone over the dental profession. Previous to about 1860, it was common practice to extract teeth the pulps of which were inflamed. There were, of course, exceptions among the leaders of the profession. To Dr. Hullihen of Wheeling, W. Va., should be given the credit for bringing out a method in the early fifties by which the effort was made to save teeth which had exposed pulps by drilling a hole through the side of the root, close to the gingival line, into the pulp chamber, and then placing a filling in the cavity made by caries without removing the pulp.*

Following this came a treatment in which the pulps were removed, and permanent dressings of cotton with creasote were inserted as root-canal fillings.†

Occasionally we come across root-fillings of that kind, but that method has long since passed out of general practice. It marked, however, a step

* See *Dental News Letter*, vol. vi, 1852–53, p. 34.

† See *American Journal of Dental Science*, vol. v, N. S., 1855, p. 458.

forward in the progress of pulp treatment. Following it came various methods of root-canal filling. The first mention I have been able to find of the use of gutta-percha as a root-filling was made by Dr. B. Oscar Doyle of Louisville, Ky., in 1872.*

We have been a little too reckless in the removal of pulps. We have not been sufficiently careful in making diagnoses between pulps which should have been removed and those which might have been saved. Several men, whose judgment we have no reason to doubt, are on record as saying that they believe that 25 per cent. of the people of the country have alveolar abscesses today, due either to dead pulps or as a sequence to pulp treatment and root-canal filling. Many of these abscesses have no sinuses, but would be revealed by the use of the X ray. To this statement recent reports have been added of cases in which the general systemic condition has been shown to be seriously involved as the result of chronic abscesses. We are therefore facing a serious problem. We should be more careful in our diagnosis, as well as in our technique in treating these cases, and every time we operate on a pulp or make a root-filling we should have these facts in mind. The reports of cases of endocarditis, nephritis, arthritis, and other affections which have been traced to these conditions in the jaws, should always be considered. We are really treating the patient, not simply a single tooth, every time we treat a pulp. We have, indeed, the patient's life in our hands to a more considerable extent than most of us appreciate.

I wish to refer briefly to a paper read by Dr. Frank Billings before the Chicago Medical Society last winter in which he reported thirty cases of arthritis, eighteen of which were either cured or very much improved by the removal of the tonsils, and in most of these cases culture taken from the tonsils and inoculated into guinea-pigs produced a similar general lesion in the pigs, several of which died. There is no difference whatever in the possibilities and probabilities of such remote infections from chronic alveolar abscess; the person who has an infection about the root of a tooth is in the same danger as the one with an infected tonsil. I mention this in order to emphasize more strongly the importance of greater care both in diagnosis and in treatment, as suggested by the essayist in his excellent paper.

In the matter of diagnosis I have little to add to what Dr. Biddle has said, except that I wish he had dwelled at greater length upon those conditions of the pulp in which he considers pulp preservation to be indicated and those in which he would advise the removal of the pulp. He said that an inflamed pulp should be removed in all cases, but not in cases of hypermia. If a diagnosis is made of hypermia of the pulp, every effort should be made to restore that pulp to normal, and to save it rather than remove it.

I am very glad that Dr. Biddle showed an X ray of a lower second molar to which arsenic was applied before the roots were fully formed. This illustration calls attention to the fact that we become careless in examination and diagnosis. Ordinarily one should not mistake a second molar for a first molar, even though it be in the position of the first. We should be on our guard for that, especially when the other teeth are not in position. We should of course

* See *Dental Cosmos*, vol. xiv, p. 371.

keep in mind the forms of all of the teeth and the time at which the roots are completely formed, and be careful in the application of our drugs.

I should like to emphasize especially the importance of antisepsis and asepsis in the treatment of these cases. There is no reason why the dentist, in the treatment of the pulp, should not carry out very nearly as strict measures of asepsis and antisepsis as would the general surgeon in an operation; no reason why the dentist should take a chance of carrying an infection into the pulp chamber, because the method of sterilization of the instruments employed is simple and easy, and there is no excuse for the use of non-sterile instruments within a root-canal.

Dr. Biddle did not mention the use of the rubber dam in connection with the treatment of these cases, although it may be inferred from his remarks on asepsis that it should be used; yet I never like to hear a paper on this subject without emphasis being laid on the use of the rubber dam. I feel certain that a large percentage of blind abscesses are due to the failure of the dentist to place the rubber dam—and I do not except the upper central incisors in making that statement; the rubber dam should be applied in the treatment of every pulp, if it is at all possible to put it on.

One word should be said regarding the possibility of being deceived in the interpretation of radiographs. Dr. Biddle showed in his lantern slides that a great error may be made as to the closeness of a filling to the pulp chamber, depending on the angle at which the ray passed through the tooth. In connection with root-canal fillings, I wish to call attention to the fact that most roots appear larger in X-ray films than they are in reality, by reason of the fact that the film cannot be held in line with the long axis of the tooth, but is usually inclined corresponding to the curvature of the overlying tissues, whereby the length of the root is exaggerated. Especially in X-ray pictures of the upper anterior teeth are we apt to have this distortion.

No reference was made to the amputation of roots, Dr. Biddle contending that this is not properly a part of his paper. Yet I think he might have properly shown us these films as emphasizing what often happens as a sequel to imperfect technique.

The principal reason, probably, why we make so many failures in the treatment of pulps and the filling of root-canals is because we fail to charge a proper fee for the service. We render to our patients no other service which is quite as important as pulp treatment, which means the life or the loss of the tooth. The general custom of "throwing in" the pulp treatment with the filling, in the manner of the merchant who "throws in" a pair of suspenders with each pair of trousers, is wrong. We ought to so impress our patients with the time and care required for pulp treatment that they will be very glad to pay us the fee which we should receive for that service. I do not speak of this for the purpose of suggesting primarily that we increase our fees; I speak of it because I know that if an operator receives a proper fee, he will be more inclined to institute good pulp treatment.

Dr. J. P. Buckley, Chicago, Ill. Dr. Black, in discussing the essayist's excellent paper, has referred to the history of pulp treatment. I am interested in this subject chiefly from the therapeutic

or pathological viewpoint, and I wish to emphasize certain phases thereof that have long been in my mind.

Successful therapy, dental as well as general, depends largely on the proper interpretation of the disease that we are endeavoring to cure. The trouble with dentists in the past, and even today, in the treatment of diseases, especially the destructive diseases of the dental pulp—and I need not particularly specify the destructive diseases—has been that they do not take up and delve into the subject of pathology, do not school themselves so that they can read the clinical symptoms of the diseases that we are endeavoring to treat by the application of therapeutic remedies. Unless we study pathology and pharmacology, and know the symptoms of the various diseases and the drugs indicated in their treatment, we shall be groping in the dark. The dentist, unfortunately, is too busy, and has to attend to too many patients, to give to the individual who is suffering from these diseases the proper time, even if he knows the real cause of the trouble. In the average case of toothache, the dentist simply endeavors to find out one of two things, viz, whether the pulp is vital or dead. That, however, is not enough to know. If the pulp is vital, we should endeavor to find out its condition, whether it is in a state of active or one of passive hyperemia, or whether there is true pulpitis or true inflammation.

I agree with Dr. Black that too many pulps have been removed. Dentists remove pulps because they are afraid that a tooth will ache after a beautiful inlay or filling has been inserted. On the other hand, when they find that the pulp is dead, they generally proceed to take the first remedy that comes to hand, place it in the cavity of the tooth after opening into the pulp chamber, and seal it in with a pledget of cotton dipped in sandarac varnish or chloro-percha, being afraid to seal the cavity with cement. If the dentist, no matter what the pathological condition of the pulp be, would always hermetically seal the tooth in the first place, he would be compelled to delve more deeply into the subject and find out just what the condition of that pulp is, so that he may seal the proper remedy into the tooth. The dentist today who fails to hermetically seal his remedy in a tooth at the first sitting, or who advises the patient to remove his filling, if the tooth should ache, either does not understand the pathological condition which he is endeavoring to treat or else has absolutely no confidence in his remedy.

I want to make the appeal here today that we delve deeply into the science of pathology and pharmacology, that we learn to read the clinical symptoms of these diseases—because then, and then only, can we apply our therapeutics along rational lines. When it comes to the question of removing the pulp, the average dentist will do so, regardless of actual conditions, because of his fear that the pulp may subsequently give trouble. When we think of the pictures that have been thrown on the screen, of the small, tortuous root-canals from which pulps have been removed that could have been saved under proper treatment, it is a question whether we are conserving the patient's interests by so readily and indiscriminately, not to say ruthlessly, extirpating pulps as has been the practice in the past. I wish to be understood correctly. I am making no plea for the preservation of a pulp that is diseased to such an extent that it should be removed, but I am pleading for the conservation of pulps which are

not sufficiently diseased to warrant removal.

I do not know whether or not it is true —and I hope it is not—that 25 per cent. of the people of this country are suffering with alveolar abscesses, but I do know that dentists have been blinking at abscesses in the mouths of their patients that they were unable to cure. They have been advising their patients that as long as a tooth, though abscessed and discharging pus, was giving no manifest trouble, that tooth should be retained. If anyone had an abscess on his toe, or thumb, or finger-nail, would he tolerate it? He would work continuously until it was healed, fearing that neglect would mean the amputation of the toe or finger, and yet it is infinitely worse for a patient to have his general systemic condition neglected by lack of attention to an alveolar abscess.

Dr. Moorehead, a student of pathology, in the *Journal of the American Medical Association,* reported recently five cases of tubercular infection of the glands in close proximity to abscessed teeth, inferring that these glands became infected through the canals of abscessed teeth, and every dental and medical man knows that from such infected tubercular glands tubercle bacilli can be carried throughout the system, these bacilli attacking any part of the body that is below par. During the year 1911 $14,500,000 was spent by the National Association for the Prevention and Cure of Tuberculosis. Dr. E. C. Rosenow, Dr. Billings' assistant in Chicago, to whom Dr. Black referred, reported recently before the Chicago Dental Society six cases in which the patients had died from endocarditis, the post-mortem examinations showing that the endocarditis was the direct result of poisons absorbed by the blood-stream from pyorrheal pockets containing pus or abscesses associated with teeth. It is time, then, that we stop blinking at these chronic abscesses in the mouths of patients, and if by therapeutics and surgery we cannot cure such conditions, let us extract such teeth, in order to avoid damage to the patients' systems.

If I have said anything in the discussion of the essayist's most excellent paper that will make dentists think more deeply along the lines of pathology and pharmacology, I shall feel that my effort to attend this meeting has not been in vain.

Dr. James Truman, Philadelphia. I do not wish to discuss this paper, valuable as it is, but I desire to correct a statement made by Dr. Black that prior to 1870 there was no treatment of root-canals. This may be true of the environs of Chicago, but not of Philadelphia and neighborhood. I have been a teacher since long prior to 1870, and I can state positively that some of us knew how to treat root-canals, perhaps not as successfully as my friend Dr. Buckley, but we did the best we knew. The trouble at the present time with many young practitioners is that they do not go back far enough; they do not understand, as a rule, the treatment and the work of the older men—the fathers of this profession—as some of us who worked at that period were able to comprehend it.

Dr. Otto E. Inglis, Philadelphia. Dr. Biddle has chosen a subject which has always been of interest to me, inasmuch as it involves clinical phenomena, scientific facts, and some degree of imagination. The proper utilization of these three factors will enable one to make a fairly just and practical diagnosis in pulp diseases, and to apply a rational

treatment suitable in a given case. All cases of arterial hyperemia are due to causes which act directly on the exposed dentin of an exposed pulp, or to causes which produce an inflammation or hyperemia of the apical tissue so that the excess of blood flows into the pulp vessels, thus establishing that aseptic overfulness of bloodvessels and the consequent over-excitability of the nervous mechanism of the pulp which are characteristic of arterial hyperemia of the pulp. A profound arterial hyperemia of the pulp produced by direct causes can, in its turn, produce an overflow of blood from the pulp into the apical tissue, and thus induce an apical hyperemia with its characteristic phenomenon of tenderness upon tapping. Venous or passive hyperemia in its uncomplicated form is almost invariably secondary to arterial hyperemia, and is due to the compression of the veins at the apical foramen by the enlarging artery. Thus, as the arterial hyperemia increases in severity, the venous variety becomes also more severe, until stasis, either total or partial, supervenes. While there are conditions producing non-septic pulpitis, the vast majority of cases are due to pulp exposure and its mechanical, chemical, thermal, and infective irritation. When an abscess upon another tooth or a pyorrhea pocket upon the same tooth approaches the apical tissue of the tooth in question, the pulp of that tooth may be infected from the apex down, and thus its infective inflammation be produced.

There are clinical phenomena which require some imagination to understand as applied to a given case in a mouth.

I will explain. Recently I vainly treated a lower right first molar for a chronic abscess on the distal root, the abscess discharging over the middle third of the mesial root of the second molar. I could feel this root with a probe. The acute symptoms having abated, I let the patient go on her vacation. A violent pulpitis ensued in the pulp of the second molar, doubtless due to infection from the abscess tract. The dentist whom she consulted diagnosed inflamed pulp, and devitalized it. I do not know whether he saw the cause in his mind's eye or not.

Now, suppose that a tooth equally loose, and equally responsive to cold, should present, and the cause be a pyorrheal pocket not reaching the apical tissue; then the treatment which to the empiricist would be correct is not a correct one, as the diagnosis changes from apical inflammation to apical pulp hyperemia, a disease entirely curable in most cases upon simple removal of the cause.

Dr. Biddle has cited an interesting case of pulp hyperemia due to the alveolitis following the removal of an impacted tooth. This is analogous to a series of causes any one of which may produce inflammation or hyperemia of the apical tissue—by mere extension—and the surplus of blood in the part goes into the pulp, hence its hyperemia and supersensitivity, and hence its response to cold.

In the consideration of all conditions of inflammation, it has been of great value to me to imagine the central area of pus—or, in non-septic inflammation, of stasis—surrounded by an area of stasis in which phagocytosis is active, this being surrounded by a zone of active but less active inflammation, this by a zone of arterial hyperemia which may fairly be regarded as the first stage of an inflammation, and this by a zone of normal tissue. It requires some

imagination correctly to distinguish these various zones in their anatomical positions as disease progresses.

Dr. Biddle's views on symptomatology coincide in the main with my own; I shall therefore not repeat them, but content myself with this brief amplification of the pathology involved.

Dr. Biddle (closing the discussion). I am greatly pleased with the discussion which my paper has brought forth. Dr. Black spoke of the use of the rubber dam. I use it always in an operation in the lower jaw, and in the posterior portion of the upper jaw, but seldom in the anterior, where I have everything necessary for the operation prepared in advance, and by using cotton rolls, and not permitting the patient to close his mouth till the operation be completed, obtain very satisfactory results.

Someone in the audience has requested me to speak of mummification, the kind of paste I use, etc. In reply I would say that mummification has no place whatever in my office.

The stereopticon operator failed to show a slide which I shall mention. The case is that of a man thirty-five years of age, with the upper right cuspid missing. The first bicuspid was crowned, with a cuspid facing attached, and there was a sinus opening above the place where the cuspid should have been. A radiograph was taken and revealed the natural cuspid above the central and lateral incisors. Two years previous to the taking of the radiograph, there had been hyperemic conditions of the lateral and central incisors, but the patient's dentist, upon making an examination, had failed to determine the true nature of the trouble, and had told him that he had better let the teeth alone. He did so, and the results are apparent. It was now necessary to remove the central, lateral, and cuspid, and to curet the bone, leaving an opening of one and one-half inches along the side of the nose and one inch in width. Had the trouble been correctly diagnosed at the time of the hyperemic condition, doubtless the central and lateral incisors could have been saved. I cite this instance simply to exemplify the need of more accurate diagnosis.

As Section III is pressed for time and there are a number of excellent papers to follow, I shall conclude my remarks, thanking the discussers for their kindly consideration of my paper.

The next order of business for Section III was the reading of a paper by Dr. T. B. Hartzell, Minneapolis, Minn., entitled "The Post-operative Treatment of Pyorrhea."

The paper here follows:

The Post-operative Treatment of Pyorrhea.

By THOMAS B. HARTZELL, D.M.D., M.D., Minneapolis, Minn.

In this short paper the writer desires to discuss the most effective methods of treating our pyorrhea cases after surgical treatment has been successfully accomplished, and when the cure seems perfect.

PYORRHEA ALVEOLARIS CURABLE.

The surgical treatment of pyorrhea is now so firmly established that it is needless to discuss it in this connection, for it is proved by a multitude of case records that the destruction of the bony process commonly noted in pyorrhea can be absolutely stopped, and the gums be made to resume normal tint and normal resistance. Unfortunately for both patient and operator, many cases are allowed to pass from observation without further care or instruction to the patients, and in the course of a few months such cases show recurrence of inflammation. The patient is therefore discouraged, perhaps goes to some other dentist, who probably does not believe that pyorrhea can be cured, and who frankly informs the patient that the disease is incurable, and promptly advises the extraction of teeth which, under proper care and treatment, could be easily rendered serviceable to the patient for a long term of years.

EFFECTS OF SURGICAL TREATMENT, AND RECURRENCE OF GINGIVITIS.

It is illogical to suppose that teeth which have lost any part of the bony process which nature built around them are as good as teeth which have never lost this supporting process, because the result of such a loss is infection of the root-surface. This infection promptly induces a deeper cellulitis of the gum margins than obtained in the original gingivitis which initiated the inflammation; the clinical picture, therefore, shows the gums swollen and perhaps a trifle higher around the necks of the teeth than normal. The first effect of surgical treatment induces just the opposite condition, namely, the recession of swelling, and because the bony socket has been reduced in height, this recession of swelling of the gingiva lays bare the neck of the tooth below the enamel margins, exposing this surface to the fluids of the mouth and to the attack of caries; then, by reason of the loss of the interproximal bone, the interproximal gum sinks, and crevices are opened to the impaction of foodstuffs, which are very difficult for the patient to remove. The decomposition of such materials brings on caries, and possibly recurrent gingivitis.

THE PATIENT'S USE OF DISCLOSING SOLUTION IN HIS DENTAL TOILET.

In order to prevent this first step in a recurrent attack of pyorrhea, it is the duty of every conscientious operator thoroughly to explain to the patient the absolute necessity for extreme care in keeping the necks of the teeth free from

all foreign matter, and to supply him with some method or means of knowing, beyond any shadow of doubt, whether or not his teeth are being kept clean. To this end the patient should be instructed in the use of a revealing stain, than which there is none better than a combination of zinc iodin 15 gr., potassium iodid 15 gr., iodin crystals 15 gr., with glycerin 4 dr., water 4 dr., carefully triturated together in such a manner as to lose absolutely none of the solid material in the mortar when decanting the same in the bottle. This disclosing solution sponged lightly upon the tooth surface by wrapping cotton on a toothpick or orange-wood stick instantly reveals to the eye fermentative materials which are otherwise transparent, and puts the patient at once upon his guard, so that he may remove these damaging substances.

PROPHYLACTIC OUTFIT FOR THE PATIENT.

The patient should be supplied also with the proper outfit for the removal of the irritating matter revealed by the stain. This outfit should consist of a properly shaped tooth-brush, flat silk, mouth-mirror, and wood-point carrier, together with suitable polishing materials, and the patient should be instructed in its use. There is a certain proportion of people who will gladly follow directions implicitly, and the time required to keep the teeth clean by this method is cheerfully spent by these individuals.

PROPHYLACTIC SILVER NITRATE TREATMENT.

For those who will not care for their own teeth, the monthly prophylaxis treatment by the dentist is the only remedy. In addition to the care of the teeth themselves, as outlined in the foregoing paragraphs, it is very wise and sometimes absolutely necessary to flush the necks of the teeth with a 10 per cent. solution of silver nitrate for the restraint of caries, or to rub a 40 per cent. solution of silver nitrate into the roots by means of a wood point held in a carrier, by first drying the necks of the teeth with cotton and hot air, then applying the strong solution of silver nitrate by vigorous rubbing, and drying it in with warm air. This treatment administered three or four times a year by the dentist himself is a vigorous prophylactic measure not only against caries but also against recurrent infection of the gum margins. The gums contiguous to the teeth themselves should be next to receive attention.

IMPORTANCE OF INTEGRITY OF GUMS.

It is the writer's belief that a hard, elastic, pink gum is, beyond any shadow of doubt, the best guarantee of freedom from infection, both local and constitutional. The inner, raw surface of the cuff or sleeve of the gum which surrounds the neck or root of a tooth whence the bony process has dissolved is a serious menace to the life and health of any individual—because it is easily possible that in an ordinary case of pyorrhea, involving perhaps the loss of an average depth of one-eighth of an inch of alveolar process, the equivalent of two square inches of ulcerating raw surface is open to infection. The bone itself, being exceedingly cancellous, renders the spread of infection in its substance from such an ulcerating surface extremely easy, and the penetration of

micro-organisms into the cancellous structures of the body of the bone is made certain by the force of occlusion —amounting to thousands of tons of pressure in a year—and this force being applied to the tooth causes the latter to act much like the plunger of a powerful syringe, injecting bacteria and the fluids of decomposition directly into the cancellous substance of the bone and the bloodvessels and lymphatics of the surrounding tissues, thus producing deep inoculation by the bacteria that happen to be present in the pyorrhea pockets or apical abscess cavities.

MASSAGE TREATMENT FOR THE AVOIDANCE OF REINFECTION.

Among the bacteria with which the raw surfaces above described may become inoculated, and which are very commonly found in the mouth, are the pus-forming varieties, of which the streptococcus and staphylococcus are *always* present. The strepto-bacillus of arthritis deformans of Goadby, the pneumococcus of Fraenkel, and the tubercle bacillus and fusiform bacillus, accompanied by the spirillum of Vincent, are constantly found in these pockets, as well as many varieties of anaerobic bacteria of which the significance has not yet been determined. There is no doubt that "lumpy jaw," or *actinomycosis hominis,* is started by the same avenue. It is therefore obvious that in post-operative treatment we should look toward the closing of lesions constantly open to infection. To this end a method of treatment should be adopted which will speedily close these ulcerating lesions to further infection. This is best accomplished by rubbing the gums external to these surfaces as vigorously as possible with some medium which will not break the mucous membrane, at the same time applying as much force as possible to them. This massage promotes toughening of the mucous membrane and healing of the lesions beneath the membrane in the pockets.

The tooth-brush has been the chief implement in use for gum massage until recently, and, when kept clean, answers the purpose reasonably well; coarse linen finger-stalls have also been used with some success. More recently the heavy cotton roll, cut in short pieces three-quarters of an inch in length and held securely by hemostatic forceps or the Kurorus devised by Dr. Skinner, has come into use. These short, heavy cotton rolls held firmly and saturated with a vegetable astringent such as Azone—which is composed of alcohol, glycerin, and an astringent—serve this purpose best of all. The short cotton roll, after rubbing all the gum surfaces both inside and outside the arch vigorously for a few moments, is thrown away, and a new piece is taken for each treatment, thus avoiding the danger of reinfection with a dirty brush. The dense cotton roll, saturated with the alcoholic astringent and vigorously used on the gums as described, causes the gums speedily to harden and shrink, and the ulcerating surface is soon protected by the formation of a dense layer of elastic and fibrous connective tissue, thus closing the lesions to further infection, and affording a reasonable guarantee that reinfection will not occur.

SPLINTS AND REMOVABLE BRIDGE WORK FOR THE RETENTION OF TEETH AND ROOTS.

The next problem in post-operative treatment is that of retaining for useful service such teeth as have lost so much

of their supporting bony structure that, even though infection has been stamped out, the teeth will be lost very soon, because there is not sufficient bone left to sustain them. In this type of cases it is necessary to supply some form of splint to compensate for the bone which has been lost. The cementing of fixed bridge work upon loose teeth is an impractical procedure, because it is impossible to keep them free from irritating matter, hence inflammation must recur. It therefore seems advisable that any form of bridge work or other prosthetic appliance be of such a nature that the patient can readily remove it, so that gum massage and thorough prophylactic work may easily be accomplished. After many years of observation the writer has reached the conclusion that removable bridges or other prosthetic appliances constitute without doubt the best practice in the after-treatment of pyorrhea. The fixed splint, such as advocated by Dr. Patterson of Kansas City, Dr. McDonagh of Toronto, and Dr. Logan of Chicago, answers admirably for small groups of teeth, as do the Case retaining appliances devised by Dr. Case for retaining teeth in proper alignment after regulation. When greater numbers of teeth have been loosened, the form of appliance which has given the author the greatest satisfaction is the combination removable splint bridge. In preparing loosened teeth for this type of retainer, it is necessary first to devitalize the teeth and cut them off at the gum margins. Then each tooth should be coped, and the cope must be made to fit the root-end so perfectly that it will not afford any irritation to the gum margin. The cope is made on practically the same lines as the cope for the Richmond crown. After all the copes are made and in position, they are removed in a plaster impression. The impression is then used to obtain a perfect model of the jaw and of the teeth upon which the copes properly belong. After this has been accomplished, the operator has the choice of two methods: (1) He may adjust on each cope a short metallic post slightly lingually to the center of the cope. All these posts are to be placed in perfect alignment, and each is fitted with a gold crown or a porcelain-faced crown, as the position of the tooth demands. After having been thus prepared, these crowns are united as in ordinary bridge work. The copes with their projecting short posts are cemented to the tooth root, and the bridge is placed upon the copes and pins in the lower arch without any retaining device whatever, the patient thus being able to lift the bridge off the root-ends at will, in order to cleanse the under surface of the bridge and to massage vigorously the gums about the root-ends. (2) If large groups of teeth are missing, it is advisable to insert a saddle in the bridge, allowing the saddle to rest firmly on the gum, thus aiding in the support of such roots as still remain in the arch. These saddles should not closely approximate the coped roots, in order to avoid irritation of the gum around the coped root. In the upper arch, or when it is necessary to obtain a greater degree of fixation than the aggregation of posts will afford, we can insert an occasional Roach attachment on the copes, hiding the spring within a molar or bicuspid dummy. When this is not advisable, we can cut a slot on the side of a post and fit a small slide in a dummy on either side of the mouth, placing it so that it will fit into the slot in the post. This slide or key, when in position, firmly locks the

piece upon the root-ends. The patient, when desiring to remove such a piece, thrusts a small pin against the slide, driving it toward the lingual surface, thus releasing the bridge from the copes and pins, and thereby permitting the easy removal of the whole piece. In certain cases it is desirable to have the bridge work fastened to the teeth in such a manner that the patient cannot remove it himself, for occasionally we find individuals who dislike removable bridge work, though the great majority seem to prefer it, as it guarantees cleanliness and prevents recurrent inflammation.

SEMI-FIXED BRIDGE WORK.

In those individuals who dislike removable work, but in whose mouths it seems essential that the work allow of ready removal, the Corcoran attachment fitted to the copes can be used. With the Corcoran attachment the copes are made and fastened to the teeth. The piece is placed in position and retained by means of small, heavy screws, which the operator can readily remove, and upon the removal of which the whole bridge is lifted out of position, so that proper prophylactic measures can be instituted as often as the teeth and tissues demand. There is a vast advantage in having all appliances on pyorrheal teeth readily removable. Occasionally an infection may recur in a single tooth or a group of teeth. If we have fixed bridge work, the difficulty of overcoming such inflammation is very great. Removable bridge work may be taken off and any material which may have crept under the bridge removed, with the result that the inflammation rapidly recedes, and the bridge is easily put in place again. If a single root should abscess under a removable bridge, it is an easy matter to remove the bridge, extract the root, and, in the course of a few weeks, add a saddle resting on the gum in the space formerly occupied by the lost root.

COMBINATION BRIDGE AND PLATE WORK.

In cases in which only a small group of very loose teeth is left in the mouth, an artificial denture only hurries the loss of these teeth, because the plate will press upon and strip the gum tissue away from the roots. If, however, instead of fitting an artificial denture around such roots, we amputate the teeth at the gum margins, cope them, and unite them with a half-round bar, and, if desirable for purposes of retention, place one or two Roach attachments on the copes at either end of the group of teeth, we may build a removable denture to rest upon the root-ends with saddles resting upon the gums. The half-round wire which is used to connect these copes will permit the rise and fall of the saddles under the stress of mastication and at the same time enable the teeth to bear and share the work of the denture, without straining the teeth or the copes thereon in any way. Since the copes and the half-round wire have oval surfaces, the denture resting on them has free play, at the same time affording all the retention necessary to approximate natural teeth more nearly than is possible in any other way known to the writer, who in his practice has under observation a considerable number of the types of splints and dentures advocated in this paper.

Discussion.

Dr. J. V. Conzett, Dubuque, Iowa. The paper to which we have listened is, in my opinion, one of the most impor-

tant on the treatment of pyorrhea that has ever been presented to the profession, because of the emphasis which the essayist has laid on the after-treatment of this disease. We know that we can cure pyorrhea, but those who are specializing in this field know that very frequently patients come into their offices with the assertion that some practitioner has said that pyorrhea is incurable, and that their teeth must be extracted. Others have been discharged as cured, but they come to us in as bad condition as before, because of the fact that they have received no after-treatment. I regard this paper as important because it emphasizes the feature that, if pyorrhea is a curable disease, it is curable just to the extent that the condition is followed up and after-treatment is instituted. Dr. Hartzell has indicated very valuable methods as to this after-treatment.

Despite the lateness of the hour, I want to emphasize a few points in regard to this subject. Cleanliness is the whole secret of cure in this disease; if that condition can be maintained after proper surgical procedure, the patient will be cured and remain cured, but if not, there will be a recurrence of the pyorrheal condition. Dr. Hartzell tells us in a measure how a cure can be accomplished, which must be done largely by the patient himself. Recently I have had two cases that had been treated by two of the best practitioners in this country, and these patients said, "Dr. So-and-so treated me and discharged me as cured, and now you see what the condition is." If the treatment had been followed up by systematic prophylaxis, there would not have been any recurrence. It would be ideal if the patient would properly maintain cleanliness himself, but we all know that patients will not or cannot do this in a majority of cases. They must be impressed with the importance of keeping their teeth free of any salivary calculus, and if they are allowed to judge of this for themselves, considerable damage is apt to be done before the patient realizes that his mouth needs closer attention than he can give to it. Therefore I believe that it is best to follow up the treatment and have the patient present himself to you or to some other practitioner in whom you have confidence, at stated intervals, that the condition may be observed and suitable prophylactic care be instituted, so as to maintain the proper degree of cleanliness and the condition established by the original treatment.

If I were to criticize any suggestion made in the paper it would be the placing of removable bridges on loose roots, because I do not believe that a removable bridge placed on loose roots would allow the deposition of the cells of granulation tissue to take place and become permanent. It would seem to me that, if granulation tissue is deposited, and the bridge is then removed, the granulations would be broken up, and no permanent attachment of the teeth would be established. I should like to ask Dr. Hartzell to tell us in closing what his experience has been in the placing of these removable bridges in loose teeth.

Dr. N. S. Hoff, Ann Arbor, Mich. The essayist has presented two most important phases of the treatment of peridental diseases, both of which are essential to successful results in the more aggravated stages of these conditions. The post-operative treatment in some cases is so complicated that no specific can be safely advocated. In all cases the surgical treatment is preliminary, although some are advocating therapeu-

tic measures for the entire treatment. The essayist has very wisely left these unmentioned, and we shall do likewise because of our time limit.

The suggestion for a proper toilet procedure for the patient is a good one, but we believe the one advocated is rather complicated for the average patient. We find that the simpler the toilet, the more likely is it to be practiced. The worst sufferers are usually busy people, who have no leisure for any but the most essential time-consuming procedures; and they resent innovations, even though they believe in them and realize their own need. They especially do not care to indulge in any habitual time-consumer. I find it difficult to induce these busy patients to remember their periodic visits to the office for treatment, but I have had some success in getting them to use floss silk and an abrasive that is convenient, such as hand sapolio, once a week. I ask them to sit down once a week before a mirror and spend a half-hour passing floss silk around each tooth. The waxed, broad floss, after being drawn over a cake of hand sapolio, is an effective appliance that patients can learn to use conveniently after a few trials, and they derive so much comfort from this process that they will keep it up after once getting the knack of it, and the habit is established. In some cases orange-wood points in the small holder made by Dr. Skinner will also be useful. This, with the use of a proper toilet outfit of brushes and powders, properly selected and advisedly used, constitutes about all the care the average patient will stand for.

The essayist's picture of the high-pressure injection of infectious material in the peridental pockets is rather overdrawn. In a case that has been properly treated surgically, there ought not to be any considerable quantity of pus or infectious material in the peridental pockets, and if so, the forces of occlusion would hardly force it into the healthy bone and soft tissue of the peridental region. I am of the opinion that the inflammatory condition of these parts is due in a large measure to local absorption, or to an auto-infection from the blood and lymph vessels. The movement of the root in the alveolar socket under the force of occlusion, especially when improperly directed, will cause a stretching of the peridental fibers, and a consequent fatigue, with nervous irritation, that results in the congestion and irritation frequently present in these cases. This condition, as the essayist observes, provides an ideal opportunity for external infection, but it is remarkable that we so rarely have serious infection from this source to contend with in these cases. The histologic pathology of these diseases has not been scientifically determined as yet, and its actual character can only be a matter of clinical conjecture, but it would seem as though the disease would spread more rapidly and would more often assume a semi-malignant form if it were of an external character or source.

Massaging the gums is certainly a useful treatment, if applied properly. It should, however, not be excessive, especially in irritable and easily congested tissues. The use of the cotton rolls with an astringent lotion is useful, but not without its limitations. The bulk of the application hinders its use on the buccal and lingual surfaces of the distal molars, and then, too frequently a severe application of an astringent lotion will dry up the mucous membrane so as to hinder the normal secretion and to cause,

after a time, an inflammatory condition that is difficult to subdue. The astringent is not indicated when the gums are normal. A simple antiseptic solution that readily mixes with the salivary and mucous secretions is better. The trouble with placing in the hands of the patients a potent drug is that they never know when not to use it. I have had good results from having the patient wet the finger and dip it in tooth-powder, particularly one containing a little myrrh or quinin, and massaging the gum, after having brushed the teeth with powder. If much friction is needed, a little powdered sulfur applied on the finger will increase the friction. As a rule, the use of detergent drugs in massage is dangerous, and should be carefully watched.

In regard to the comparative merits of fixed and removable bridges serving as splints in pyorrhea cases, it is difficult to dogmatize, especially since the innumerable variations of the cases presented have to be treated as individual cases, scarcely two ever being alike. As a rule, I find that teeth that are left free in their own sockets recover sooner than those that are held rigid by a splint. This, of course, is largely dependent upon the extent of absorption of the supporting structure, and the liability to continued irritation from malocclusion. For this reason, and also the reasons given by the essayist, I prefer temporary retention to the fixed splint or any such radical operation as that advocated in the paper. The advantage of a temporary fixture is the possibility of avoiding a fixed retainer, or such a formidable operation as is suggested. In the large majority of cases the teeth can be temporarily retained by the use of ordinary brass ligature wire, such as is used by orthodontists. The orthodontic arch is another valuable means for temporary retention. By these means the teeth can be held in approximate position, with just enough freedom of movement to afford the stimulation to the root environment during occlusion required to cause healthy nutrition, and sufficient recovery in time to justify the removal of all retention. These appliances can be so adjusted as to allow perfect cleanliness, and they can be changed or modified so easily that in suitable cases they are much to be preferred to any fixed bridge work. There are, of course, cases where many of the teeth have been lost, and some form of bridge work and splint in combination becomes necessary. In such cases, I have first used the temporary splints to secure recovery of the peridental tissues to a normal condition, and then have had satisfactory results from fixed bridges.

The operation suggested by the essayist is similar to that suggested by Dr. W. V-B. Ames,* and I should object to it on the principle that it involves the destruction of the pulps in teeth that are practically sound, also because it involves banding or capping of the roots at a point where extreme skill is required to produce a condition that is even tolerable by the tissues. Banding or capping undoubtedly renders prophylaxis difficult and uncertain. I do not wish to put my judgment against that of Dr. Hartzell, who has had so much more experience in dealing with this condition, and who I am sure would not advocate a procedure had he not thoroughly tested it out. I have never been able to satisfy myself that the destruction of pulps in teeth affected by peridental inflammation

* See Transactions of the National Dental Association, 1901, page 119.

is necessary in any considerable number of cases. Pulps must be extirpated in cases of encroachment of dental caries and uncontrollable sensitiveness, but in my judgment pulp extirpation should not be resorted to as a means of curing peridental troubles, because I know that these conditions can be cured without resorting to this procedure, and also because I am convinced that in a pulpless tooth the peridental attachment will certainly degenerate more rapidly than in one in which the pulp is vital. It is my opinion that permanent cures of pericementitis are more practicable in teeth with vital than in those with dead pulps. It is practically impossible to keep a root surface smooth in a pulpless tooth. Besides, the additional hazard of bad root-canal filling and the resulting apical trouble must be taken into account, this being no unimportant consideration in our decisions as to methods of procedure. I have no doubt that the essayist's method will be of great service in some cases, and that operators possessing the skill and judgment of Dr. Hartzell can use it advantageously in many cases, thus adding materially to their resources; but at the same time I fear that in the hands of practitioners of average skill and immature experience, the virtues of the procedure will be endangered, and more harm come from its use than benefit.

The essayist's other suggestion of attaching plates and saddles to isolated teeth is also liable to result in disaster in teeth having a tendency to peridental trouble. In the majority of cases, the retention teeth will become affected, and be lost in a few years. We should like very much to see our way clear to adopting the removable splint in the treatment of these conditions, as it certainly possesses more sanitary features, but our experience has led us to have more confidence in the fixed bridge for the sake of permanence.

Dr. J. D. Patterson, Kansas City, Mo. It surely must be said that when disease of the gums has progressed so far as to involve considerable gum recession and loss of underlying alveolar attachment, a recurrence of the trouble after the initial treatment is more rapid than at its first appearance. It therefore is of vital interest to know how best to avoid its recurrence, and our essayist deserves high praise for bringing the subject to our consideration.

In advanced cases of pyorrhea we do not anticipate more than satisfactory relief and comfort in the affected tissue. A "cure" under these circumstances is a misnomer, for that term, to the patient's mind, involves the restoration of the lost tissue and a return to original conditions, which can only be expected in the first stages of the disease. The question therefore is, how we can prolong or render permanent the relief which we have obtained after instrumentation. To attain this end, several methods have been suggested, which may be divided, however, into two, viz (1) local sanitary measures, and (2) systemic treatment.

In the first class we confine ourselves to all means of preventing irritation and infection by various mechanical means and by the local use of antiseptics, germicides, absorbents, stimulants, or cauterants. In the second class we seek additional aid from drugs or serums acting systemically, and the question before us therefore is, Which method is the most potent in restoring the health of the involved tissues? Does the employment of drugs or vaccines retard or pre-

vent the recurrence of the disease after operative skill and scrupulous hygiene have been exhausted?

Let it be understood that the question of drugs should not be considered until after all mechanical skill and after-care have been exhausted; and those who proclaim that vaccines render unnecessary much of the surgical removal of irritants —and they are not a few—do not, I think, merit the least consideration. We are prone to be slaves to drugs. In these days dental and medical literature are full of cure-alls, as from time immemorial, yet it can be noticed by the careful observer of the trend of current thought that more and more reliance is being placed upon good food and diet, fresh air, sunlight, reasonable exercise, plenty of sleep, and freedom from care, and many great minds have thrown off the shackles and have declared that drugs are rarely, if ever, actually curative in their effects in systemic conditions.

When some twenty years ago the systemic treatment for pyorrhea was first advocated, I hailed it as the crowning relief, and made diligent use of this therapeutic method, said to be effective. Careful observation, however, has entirely failed to show the benefits of this or any other remedies more recently brought to notice. Now we are strongly advised to adopt the vaccine treatment, and the pages of our journals are filled with reports in which relief or cure is supposed to have been effected. This reminds us that if one is prone to believe a certain thing, he can find any amount of evidence in support of his contention. Our knowledge of pathology is so limited that we would gladly call to our aid some therapeutic measures, but the actual benefits derived from drugs are difficult to determine. We have all heard of cures or improvement in pathological conditions in which absolutely no drugs have been administered. They "take up their beds and walk," even though no "laying-on of hands" has been practiced. So we must go very warily when we say that drugs have produced this or that cure, and remember that the *vis medicatrix naturæ* may have had a hand.

A very remarkable paper has recently been published from the pen of Dr. Beverly H. Robinson of New York, who has spent a lifetime in hospitals and private practice. Among other statements he says:

> All medical men today who are thoughtful and informed recognize fully how much more important it is to prevent disease than to cure it. Indeed, what is termed a cure is not in any strict sense a cure at all, nine times in ten, in acute disease, medical or surgical. Nature with intelligent guidance, which usually means little or no active interference, works out the ultimate well-being of the patient so far as may be. Of course, I do not wish to say for an instant that there should not be help rendered in a proper and judicious way. This may be given by a good and reliable nurse, sometimes without much, if any, medical supervision on the part of the physician or surgeon; again, with oversight and instruction from time to time by the latter. But as to very frequent counsel or advice, acting from either source, it is often more than questionable whether or not benefit results. . . . Do we really cure chronic diseases? I fail to have seen it in the large majority of instances. We simply render them more bearable, and by modifying or lessening symptoms for a shorter or longer period, we give comparative ease and comfort, and no doubt also prevent at times the development of certain untoward sequelæ. If the foregoing be admitted as true, doesn't it seem far better to interfere medically or surgically as little as possible? Doesn't it seem wrong to give medicines to correct what at best is doubtful as to origin and consequences, or to use the knife except where the evident condition and natural results amply

justify it? . . . Perhaps there are a few exceptions, because up to date we still acknowledge a few specific drugs. But apart from these, I challenge my affirmations to be gainsaid successfully.

In the light of these extracts, what becomes of the claims that a diabetic patient must first be treated for that complaint ere local surgical treatment of concomitant pyorrhea shall be instituted? What of the claims that faulty metabolism must be corrected before local surgical treatment avails? What of the claim that vaccines will be the coming antagonist to pyorrhea alveolaris, and that local treatment is unsatisfactory? The advocates of these measures with one accord claim that pyorrhea is caused by "faulty metabolism and its irritating end-products," and that first of all faulty metabolism must be eradicated or the "opsonic index raised." How soon do these men expect to correct and cure faulty metabolism, if it has become well enough established to cause pyorrhea? Beverly Robinson says *this cannot be done;* that nothing more can be done than to alleviate. In the very last work on pathology by Adami we find that the evidences of faulty metabolism do not come at once, but after a long time of high living, alcoholic indulgences, or other bad habits, if it is not caused by hereditarily predisposed tissue.

The whole weight of the most recent and best authority proves that serious faulty metabolism becomes manifest after long abuse of proper nutrition, and that its cure is well-nigh hopeless. Dr. Beverly Robinson would certainly place this disease in the class that drugs would never cure.

Those who preach the virtues of systemic treatment for pyorrhea must necessarily find systemic conditions to combat, and so they have made the strange pronunciamento that all, or nearly all, who suffer with pyorrhea are on the brink of the grave. One extremist says that those of his patients who have pyorrhea are syphilitic; another that they are usually tuberculous; another hints at degeneracy, while a large coterie sing the song of waste end-products and the uric acid diathesis.

In my opinion, rational "post-operative treatment" consists in the maintenance of perfect sanitation secured by proper brushing with a proper brush and plenty of powder. The interproximal spaces must be cleansed of food remains and glutinous deposits inviting fermentation, by the careful use of Cutter ribbon floss and of a high-power blunt-pointed syringe charged with a salt solution, in order to reach and remove all matter which would soon become irritative. This latter work should be accomplished by the patient under the operator's careful guidance, or, if that is not possible—and often, it seems, it is not—the operator himself should do this cleansing at frequent sittings, all with the express and positive idea *absolutely to divorce the dental organs from any form of irritant whatever.* Instead of drugs and vaccines, if any prejudicial systemic conditions exist, open air, golf, tennis, walking, the drinking of plenty of pure water, sleeping in the open air or with wide-open windows should be prescribed, thus stimulating phagocytosis and the bactericidal action of the blood serum until the "opsonic index" is raised to normal.

In hundreds of cases positive relief has been thus assured, and "so far as the mind of man runneth," or science has proved, there is little necessity for deluging the internal economy with

lithia compounds—breeders of appendicitis—or by injecting dead bacteria which may relieve one condition and yet cause a graver one.

The essayist is a careful and successful specialist in pyorrhea, and his paper is a distinct addition to the literature upon after-treatment in cases of gum disease, such treatment being entirely of a local character, the writer ignoring, apparently, the benefits supposed to be derived from systemic treatment. I cannot criticize his position, as it coincides with my view of the matter, but considering the prominence which is being given to systemic remedies, especially to vaccines, in dental literature and at dental conventions, it would seem that the essayist should have noticed these as belonging in the speculative field, at least, of post-operative treatment.

The essayist's observations upon conditions following surgical treatment, and his description of the methods by which a cure or relief can be rendered permanent, are to be commended, though the use of a stain—composed of zinc iodid 15 gr., potassium iodid 15 gr., iodin crystals 15 gr., glycerin and aqua 4 drams each—by the patient as a "revealing" stain for the purpose of detecting fermentative plaques should perhaps be criticized. This preparation is suitable enough for the dentist's use before and after instrumentation, but it is too potent, we think, for frequent domestic use, nor is it necessary, for if brush and powder are employed correctly, no fermentative patches will remain to be revealed, save in concealed interproximal spaces not easily viewed.

Considerable space has been devoted in the paper to the important consideration of retainers, but it seems hardly appropriate to consider these under post-operative treatment, for I think that in nearly all cases retainers should be applied before instrumentation. Teeth that are so loose that their movement annoys the patient, precludes cleaning with the brush and prevents healing, can scarcely be scaled until they are firmly held in position, and the most suitable time for splinting them is prior to the surgical procedure. A fixed splint of one form or another is placed in such a way that the scaling is not rendered difficult, and the cleansing with brush and points can be perfectly accomplished.

The remarkable splint bridge described in the paper, made by cutting the teeth off at the gum margin, placing a pin and cope on the root permanently, soldering the copes together, and placing a removable bridge upon that foundation, would seem an unjustifiable appliance unless the crowns of the teeth were in an advanced stage of caries. Every practitioner, moreover, who has given attention to this subject knows that such dental arches as have been attacked in their entirety by this disease usually exhibit good teeth, free from caries. The expense, also, of such a complicated procedure would, it seems, render it prohibitive to the large majority of patients. Each operator, however, has his own peculiar way of accomplishing satisfactory results, and each case may demand a different method for reaching the desired end.

Dr. Wm. Crenshaw, Atlanta, Ga. I have been very greatly interested in the discussion of Dr. Hartzell's paper, as I am with everything pertaining to pyorrhea, because I am doing that kind of work exclusively. I think Dr. Patterson's ideas as to post-operative treatment are most sound and correct. Dependence on drugs of one kind or another

is hardly to be countenanced in this day and time; there was a time when drugs were depended on to do everything. Fifteen years ago I asked Dr. James Truman what antiseptics he would use in pyorrheal pockets after instrumentation to effect, or assist in, a cure of pyorrhea. He opened my eyes for the first time, by asking me what need there was for an antiseptic in a pocket from which all necrotic tissues that had established and maintained the irritation had been removed by proper curetment. "Well," I replied, "would it not be well and safe to introduce a positive antiseptic carried into the pocket for the purpose of killing any form of bacteria there?" His answer was that if any bacteria or irritating material were left in a pocket, it would not be disposed of by antiseptics. He said, "If you can do it that way, what is the use of doing anything else? Why not place the antiseptics in the pockets and have the cure at once?" I have proved to my satisfaction that if the pockets are properly cleansed by removing all incrustations from the roots, and any patches or vestiges of necrotic membrane sticking to the surfaces of the teeth—then they may be filled with any one of three dozen antiseptics, and a cure will be effected. From experience I have found that the pockets will be cured without the injection of any antiseptics whatever. I have proved this convincingly by treating the teeth on one side of the mouth by injecting antiseptics in the pockets, and limiting myself on the other side to as perfect instrumentation as possible, and the pockets not injected with antiseptics became quite as healthy as the others. Any operator can prove this to his satisfaction by a trial.

Dr. E. A. Lundy, Los Angeles, Cal. I am in hearty accord with the remarks of Dr. Patterson and Dr. Crenshaw. Dr. Patterson's suggestion of retention before cleansing seems to be very advantageous. I have resorted to relieving all malocclusion, but have never inserted permanent retentive appliances before instrumentation, and I fully appreciate Dr. Patterson's useful suggestion.

Pyorrhea is not caused simply by malocclusion or improper care in cleansing the teeth, although these are both important etiologic factors. In my opinion, however, seventy-five per cent. of cases of pyorrhea are caused by malnutrition. I have myself suffered very much from pyorrhea for a number of years. I was able for a time to be under the care of Dr. Younger, formerly of San Francisco, but afterward was limited to what treatment I could apply personally. Those who treat pyorrhea know that one cannot properly care for his own teeth, so my teeth became very badly incrusted.

Neither Dr. Patterson nor the essayist, if I remember correctly, spoke of this disease with a view to dietetics. I have had great success in dietetic treatment when I have been able to obtain the patient's co-operation. The patient is put on a non-uric acid diet as strictly as possible. We have to learn, of course, from the patient's report from time to time as to a desirable or necessary change of diet. I usually ask my patients at the first consultation whether they indulge in stimulants such as tea or coffee, particularly coffee. Generally I find that when the patients refrain from tea or coffee, I am able to cure them more quickly.

Dr. M. L. Rhein, New York. Having been asked to say a few words, I would like to protest against the tenor of

the discussion. The essayist's purpose is not being adequately served when a discussion is raised on etiological factors, which Dr. Hartzell did not intend to consider in his admirable paper. Realizing that the treatment of these conditions does not vary, no matter how much different practitioners might quibble over their genesis, he confined himself solely to treatment. Consequently, it seems bad taste to bring up some phases which the essayist has carefully avoided, because he desired to confine the discussion to methods of treatment.

Nevertheless, I must protest against the peculiar views on pathology that Dr. Patterson has given utterance to. It requires a peculiar imagination to see a practical phagocytosis ensue from exercise. The raising of the standard or quality of certain substances in the blood not entirely known even yet, which is spoken of as raising the opsonic index, is something entirely apart from phagocytosis.

It is a great pleasure to approve of the essayist's methods, and I would especially approve of the teaching opposed by Dr. Patterson, the essayist contending that the retention apparatus should not be applied to teeth before treatment. If Dr. Patterson had said that, when the teeth are very loose, some temporary splint should be applied during treatment, he would have met with approval. The treatment of these conditions almost invariably is complicated with a correction of malocclusion, and only when treatment has been concluded can there be any positive knowledge of the position which the teeth should maintain. It is not uncommon to see a splint fail to secure the benefit intended because the teeth have not been placed in the most desirable position. Twenty-five years ago I first called the attention of the dental profession to the great value obtained by splinting loose teeth together permanently. At that time I carefully illustrated the steps taken in bringing them into proper position, and demonstrated the splint as the locking device, after the parts were healthy and the malocclusion had been corrected. This doctrine has stood the test of all this time, and consequently I strongly protest against a form of treatment that is generally followed by disaster.

Dr. Hartzell (closing the discussion). I have no wish to refute the statements of the men who have been kind enough to give my paper attention, with the exception of possibly two remarks that have been made. I did not bring out that phase of post-operative treatment which deals with the raising of the opsonic index or the increasing in the blood-stream of those substances which have the power to inhibit bacterial progress in the system. I had expected to take some little part in the discussion of another paper that dealt with that particular subject, but I did not undertake it, for the reason that in ninety-nine per cent. of cases treated surgically such post-operative treatment is unnecessary. Perhaps I am putting the percentage a little high, but I wish to leave the idea in the minds of my hearers that the main points brought out by Dr. Patterson and those who followed, and in my paper itself, would tend to show that such systemic treatment is not necessary. There are a few cases in which we can build up resistance by the use of vaccines, and in these few cases it is well enough to resort to vaccines; but these instances are so few, comparatively, that it is not

necessary to consider them under the heading of post-operative treatment.

I want to make another statement. Of the splints described, three out of five were attached to teeth the roots of which were not much more than an eighth of an inch long, and have been in the mouth from three to five years. No matter whether or not I was justified in putting splints on these teeth, I will say that none of them would have been preserved until today if I had not inserted that appliance, and I leave it to your judgment whether we should insert a splint and fix the teeth, or leave them loose in the mouth.

Section III then adjourned until a later session.

WEDNESDAY—Evening Session.

Section III was called to order on Wednesday, September 11th, at 8.30 o'clock, by Dr. A. R. Melendy, president of the association, who introduced Dr. W. H. G. Logan, chairman of Section III, as the presiding officer of the evening.

Dr. Logan announced that the music of the evening would be furnished by local talent, through the courtesy and kindness of Mr. Bristow, superintendent of the Sunday-school of the Calvary Baptist Church of Washington.

Dr. Logan then introduced Dr. H. W. Wiley, the first speaker of the evening, who delivered an address entitled "A Consideration of the Effects that Impure Foods and Adulterated Drugs Have upon the Human System," as follows:

A Consideration of the Effects That Impure Foods and Adulterated Drugs Have upon the Human System.

By Harvey W. WILEY, M.D., Washington, D. C.

Mr. Chairman, ladies and gentlemen,—When I came into this room, realizing that I had not long been a member of the party, and seeing the severe simplicity of the garb of the male members (on account of the heat many were *en manches de chemise*), I wondered if I had struck a democratic ratification meeting, but when I heard the shouting and tumult, I knew I was mistaken, and that I was in a convention of "bull-mooses." My principle is to catch them coming and going, and so I talk for both.

FOOD AS OF PRIME IMPORTANCE TO HUMANITY.

Eating is the greatest industry of humanity; we know that it is widely pursued by all civilized nations, and those of

the missionaries who come back tell us that it is practiced also by the savage cannibal. I need not substantiate this, although I have been put down in the Ananias club, but if I were called upon to substantiate it, I should undertake to determine what percentage of human endeavor is devoted to supplying the food of the people. It would certainly be a great proportion of all human effort, if we had any method of getting at the truth of the matter. The principal outlet, I believe, for the salaries of most laboring men and of all wage-earners of every description is to supply the wants of their bodies and their families' bodies; therefore I say it is the principal industry of humanity, and it is that industry which requires of man the greatest amount of his effort.

NECESSITY FOR CONSERVATION OF THE TEETH, AND SUPERIORITY OF AMERICAN DENTISTRY.

Granting for the moment that this is a true statement, it follows that everything connected with that industry is of prime importance, and I take it that all agree with me that, after the cook, the teeth serve the most important function in the nutrition of man—even more so than the cook, for if we have good teeth we can eat raw foods and do not need a cook. It is a pleasure to me to see assembled and be able to speak to such a body of men, whose duty it is to care for the teeth of humanity. I speak with the greater pleasure on this occasion, because it is recognized the world over that American dentistry leads the world in its profession. There may be nations whose physicians are greater—I doubt it, but there may be; there may be nations whose surgeons are more eminent—I doubt that too, but there may be; but I think there is no question of the fact that American dentistry stands first among all the nations of the world. No better proof of this could be given than to point to the success which many American dentists have attained in foreign countries, simply because they have brought into those countries improved methods in their science as taught and practiced in the United States. Therefore I am addressing tonight a body of men who are leaders in their profession, and who have come from all states of this country to take part in the deliberations of this national body.

I am not a believer in that theory according to which one can chew a very little bit of food long enough to make up for a square meal. [Laughter.] I believe in good chewing, and a lot of it. At dinner a very good friend of mine—a man who is somewhat of a valetudinarian and who devotes a great deal of time to thinking what he shall eat for his best welfare—and myself were discussing the subject of nutrition, and he said that the least lapse from the regular course of living might be followed by serious incapacity. I said that I was sorry he had to be so careful; that I for one gave no thought to what I was to eat; that I had followed the scriptural advice about the morrow, as to "what ye shall eat and wherewithal ye shall be clothed"—I let other people worry about that. "Sufficient unto the day," it is further said, "is the evil thereof"—and sufficient unto the day is the food thereof; the thing is, to get enough of it.

Another thought that struck me as I looked at this audience and first thought it was a democratic meeting, was that the democrats had not had a chance at the public crib for more than

sixteen years, and when I saw the fulness and roundness of your forms and faces, I was convinced that I was not addressing hungry democrats. You believe, evidently, in supporting in practice the efforts of your profession, and you show in your physical appearance only good nutrition and the good mastication which goes with it. Evidently you either practice on yourselves, or go to your brother to do it. Dog does not eat dog in the professions. So the physician who gets ill can have all the others left to get him well; as one professional brother, you can invite all your professional friends around to attend you, as far as compatible with your own safety; but you do not want to get too many! You know the testimonial Dr. Quack received: "Dear doctor,—My mother-in-law was at death's door. She took two bottles of your remedy, and it pulled her through." [Laughter.]

DUTIES OF THE STATE IN REGARD TO HEALTH PRESERVATION.

We hear a great deal at the present time about medical inspection in public schools, and no one believes in this more than I do. Whatever we may think ourselves about the matter, the fact remains that we are becoming every year more and more socialistic, becoming confirmed more and more in the belief that the state owes us something as citizens; everybody is becoming more sensitive to the idea that the state must care more than it has been doing heretofore for its citizens. We realize it today in the public schools. What right has the state to establish public schools under the doctrine of human rights? None whatever. The citizen must care for himself, and the state has no right to interfere with his education; and yet what would we think of the person who would preach today the doctrine that public education was wrong? No, it is right, and public education is but a step toward socialism —the state does for the citizen what the citizen may do for himself, according to the theory of human rights. We are adopting that idea in education, as well as in the matter of public roads, so that we can all drive automobiles—at least those who have been in practice a few years can do it; our poor farmers of the East cannot do it yet, but they do out West—even if they have to put a mortgage on the farm. Thus we are more and more adopting the doctrine that the state must care for our opportunities. We are also coming to realize that the state must care for the health of the public, and we are coming to it rapidly. [Applause.]

IMPORTANCE OF PRESERVATION OF DECIDUOUS TEETH.

When are we going to begin to care for the health? I should say that in the first years of toothhood—this is a new name!—we should begin to care for the health. The baby's mouth should be as carefully cleansed as the adult's every time it takes a square meal. The little tooth that just puts forth its appearance—and I have seen two in the last month that are the sweetest little teeth you ever saw—must be cared for. [Applause.] I can assure you that I never have taken so deep an interest in dentistry as in the last few months. I have not only made one examination, but about a hundred, to try to see if these young teeth were all right. So I say, in the first days of toothhood the care of the public health should begin.

The state should see to it that its citizens are taught these principles of oral hygiene, which they can apply to their own infants in the beginning of their toothhood years. You may say that these teeth are only deciduous. That is true, but there is no reason why they should be lost by decay, because decay is contagious, and if it attacks the deciduous teeth there may be an infection left for the permanent ones, and then those permanent ones may be only as "temporary" as the first. And yet how careless we are, every one, of these first teeth!

Last year, while visiting my farmer, who has three little girls ranging from three to eleven years of age, I noticed that they paid no attention to their teeth at all, and so, in the goodness of my heart, I gave them tooth-brushes and told them how to use them. Some time after that I was back at the farm again, and I asked one of the little girls if she used her tooth-brush three times a day as suggested. "Oh, no," was her reply, "we are saving them until we become grown girls" [laughter] —then, of course, there would not be anything to brush. That was her idea of the way to use the gift; she would not use it in her childhood days, but would wait until she was grown and had no teeth. That is the way people regard the ordinary fundamentals of public health. The important thought to impress on them is that we cannot have good health without good teeth, and yet how often we leave the teeth to rust and be thrown on the scrap-heap early in life! I have seen in the year past girls of fifteen and sixteen years with teeth so badly decayed that they were almost as good as gone, simply owing to negligence on the part of their parents. When I was a child nothing was heard in the public schools of the idea of taking care of the teeth. It was not mentioned in the public schools of that locality. We were taught hygiene of the body in a way, some primitive ideas of living, but never a word of that most important part of personal hygiene, viz, starting infant as well as adult life with a good set of teeth.

Not everyone is born, like Richard Cœur de Lion, with a full set of teeth. That only happens to geniuses, but of course the brighter they are, the sooner they have teeth. My son has two teeth at four months of age. [Laughter.] But whether they erupt soon or late, that is the time to begin to brush them. The teeth are like other blessings. We all know how "blessings brighten as they take flight," and I never appreciate a tooth so much as when I see it coming out of my mouth in the hands of a dentist, because I realize that it is through my negligence that I have lost it. There is no physiological reason why a man should ever lose his teeth; there is no reason why he should not keep them until old age, and I can assure you that, to my mind, there is no better way of reaching old age than by the preservation of the teeth. [Applause.]

DENTAL INSPECTION OF SCHOOL CHILDREN ADVOCATED.

For this reason, while I approve of medical inspection in schools, I approve also of dental inspection. Although this is no new idea, I insist that we should care for the deciduous teeth, and preserve them before the child goes to school. The state can hardly go into the homes and command that we shall preserve our children's teeth, but we can

preach at least to the rising generation, so that when they become parents they will realize the importance of tooth conservation. We cannot perhaps save the teeth that are erupting now, but we can do so twenty or forty years from now, just as I preach the doctrine of saving infants' lives. We cannot save the infants dying at the rate of a thousand a day now, but we can save those that will be born forty years from now by beginning to preach infant hygiene today, so that the new generation will grow up with a new idea and a new purpose, namely, to preserve intact as long as possible that precious endowment that has come to us, which we call life—that mystery which we cannot fathom, that heavenly gift which we should appreciate so much as to care for it so that we may get the most possible out of it. Therefore what I say tonight is not for the children of today—it is too late for them, but for the next ten, twenty, and thirty years, when the child will be taught at the family fireside the principles of personal hygiene before he goes to school. As I have been preaching for the last third of a century the health of the public and the importance of preserving human life chiefly by means of proper nutrition, so I have more and more become convinced of the extreme necessity of saving the teeth for the purpose for which nature intended them.

PREDIGESTED FOODS DISCOUNTENANCED.

That brings me to the fact that our country is being flooded with preparations which are prechewed and predigested, with all kinds of infant, invalid, and breakfast foods, the manufacturers of which have taken the trouble to perform the functions not only of mastication but also of digestion. By this feeding of mankind with partially digested food, what happens? Just what happens to everything that is not in use. The next time you take a trip on a railroad, look out at the silver-like appearance of the rail that is in use, and then at the one at the siding which is rusting away. Both tracks are made of the same steel, probably put down at the same time and in the same way, but one is bright and shining, and the other is rusting away because it is not in use. So it is with every organ of the human body; there is a legitimate physiological function for it to perform, and the law of all nature is, that if an organ fails to perform the function that nature intended it to perform, its function diminishes in efficiency, and every time we take prechewed and predigested food we injure the teeth and the stomach. After I have lost my teeth I will thank the manufacturer for chewing for me—until I can raise money enough to get an artificial set. After my stomach is gone and is no longer able to perform its functions, then I will thank him for digesting my food for me; but as long as I am in my present condition—I still have a few teeth left, and also a stomach which produces every day a certain amount of pepsin and other secretions necessary to dissolve my food—I do not want anybody to chew for me, and I want to do my own digesting; and I can assure you that I derive a great deal of comfort from both these performances. Even if this is not the best, I like to have the pleasure of doing it myself. In this respect I do not believe in socialism; that is one of the things that I do not want the state to do for me unless I become incapacitated. If you want to lose your teeth as soon as pos-

sible, eat prechewed foods, and if you want to ruin your stomach, eat predigested foods. The Lord knows that most of us can digest our own starch, and do not need the chemist to put sulfuric acid in it to dissolve it for us. All the efforts of the makers of the more modernized foods seem to rest on the assumption that we have no teeth and no gastric juices, and both of these assumptions are erroneous. True dental hygiene demands normal, natural foods on which the teeth and the stomach can exercise themselves, in order to perform their normal functions; and I think, in saying this, that I am preaching not only good physiology, but plain common sense, and am voicing the experience of everyone who has taken the trouble to look into this matter at all.

SOME DIETETIC HINTS.

My next theme is how to give the teeth proper food for mastication, which is as important as having the mill to masticate with. The miller may have a good upper and lower millstone, but if he tries to grind pebbles into flour, he will have hard work. So, after we bring into good condition the millstones which nature has furnished, let us bring good grist to the mill. That is the reason why I have made the keynote of my fight for public health, good, nutritious, unadulterated food, because, without this, health is impossible; and in the same way the dentists of this country should do their share in this great warfare for the welfare of the public. This follows as a natural corollary to that which I have already illustrated. After we have secured the nutritious food which is necessary to the happiness and health of man, we must have proper mastication. I am not so extreme on this question, however, as Mr. Fletcher is. I believe in his doctrine, but, like the rest of us cranks, perhaps he emphasizes it too much. Still, I believe in thorough, slow mastication, in careful selection and a proper and generous quantity of food. I am not an apostle of starvation; I do not believe that humanity will be helped by starving. I am a great admirer of Upton Sinclair, but when he says that fasting will cure every form of disease which attacks humanity, I say, "What are you going to do with the man who is dying of hunger? Thousands are dying from that, and do you propose to preach that doctrine to them?" Fasting is good for a man who habitually overeats, and a great many of us are too well and too often fed.

A few years ago I addressed a company of farmers, worth fifteen millions or more each, and as I looked at them at Sherry's, sitting around the table drinking champagne which cost as much as the milk they produced—when you visit one of these farmers they set before you milk and champagne, and suggest that you help yourself, one costing as much as the other—I felt that they were in danger. I am not speaking disrespectfully of these men, but every one of them was eating himself into an early grave. It is said that Napoleon ate himself into Waterloo; that had he not been such a gourmand and had he not dulled his faculties by overeating, the battle of Waterloo would not have been lost by him. And these men were Napoleons of finance, and were eating themselves into their Waterloo as fast as they could. For that kind of people, fasting is good. The man who really works, who puts forth exertion every day to the utmost,

is not the man to preach starvation to, but the man who "sits still," as Mrs. Browning says, "in easy chairs and damns the general world for standing up"—he is the man to recommend starvation to. Physiologists all over the world advise us to eat pure food and masticate it well, and that is the doctrine I preach to you tonight.

PREVENTION AS THE AIM.

Let me ask for a moment what is to become of the medical and the dental professions in that day, which I hope is not far off, when disease will be banished from this world, and when all will be born, not with actually sound *teeth*, but with sound germs for perfect teeth, which are not found in all newly-born today. We inherit the tendency to caries, as all know. What is to become then of the physician and the dentist? I have said this summer in lectures before chautauquas that only two really learned professions are necessary to the happiness of mankind, the one the profession of agriculture, the other the teaching profession, to which we all belong—every good citizen is a teacher. When the propaganda for public health has had its full fruition there will be no disease, and as far as we are informed at the present, we would have no need of physicians; and when my propaganda for good teeth has reached its fruition we will have no need for the dentist as he works today; but, as we shall see immediately, physicians and dentists will still be needed in another way. Then I hope, when we are all perfectly well and need no doctors, and when we have good teeth and need no dentists, we will not need many preachers. We will be so good that we will not need anybody to tell us how to get to heaven—we will just get there naturally; and when we do not need any ministers of the gospel, we will not need any lawyers; we will not break the laws. In short, in the Wiley millennium there will be no physicians, no dentists, no ministers, no lawyers, just farmers and teachers—that is the Wilson platform, that's all. [Laughter.] My friends, I am not trying to put you out of business, since, as I have said, there will still be use for the physician and the dentist. We will be employed then for the prevention of disease of the body and the mouth, and then, in those future days of ideal socialism, the physician and the dentist will be employed as officials of the state to look after the health of the state, and their salaries will be in proportion to the good teeth and the health of the people, and as people become sick, and lose their teeth, the salaries of the physician and the dentist will diminish! That is the way in which we will employ the physician and the dentist of the future; but you need not be afraid that you will lose your jobs tomorrow. Somebody will have toothache tomorrow in spite of my talk, and that ideal time is still far off. It is not going to come through any battle of Armageddon, but it will come through the preaching of the gospel of health and the teaching of this generation and the next to care for their children's teeth and health, and not have them die by the thousands, as they are dying today in the United States. Nearly a thousand babies not yet one year of age have closed their eyes today in this country of ours, and this can be avoided when the mothers and fathers are educated to understand the principles of hygiene, and know how to bring healthy children into the world, as well

as care for them after they are born; these will grow up to be healthy men and women, and gray hairs will be as common then as bald heads are today [laughter], and we shall not look with disfavor on age, as we do at the present time. Then we shall have four grandfathers and grandmothers, instead of none, and happiness and prosperity will come to this country; not wealth for the few and poverty for the many, but an even distribution of the wealth of the country, according to the individual's effort and usefulness, and everyone will have an opportunity to make an effort for the good of the world, and health and happiness and contentment will be the lot of humanity. [Applause.]

Dr. Logan, the chairman, then introduced the next speaker of the evening, Dr. George Edwin Hunt, Indianapolis, Ind., who spoke on "Teeth and Health," as follows:

Teeth and Health.

By GEORGE E. HUNT, M.D., D.D.S., Indianapolis, Ind.

Mr. President, ladies and gentlemen, —Our distinguished guest of the evening, as you all know, has been engaged for some years in harassing those who desire to put impure or adulterated foods and impure or adulterated drugs before the American people, and has displayed such pernicious activity in this direction that naturally those who desire to profit by that sort of business did what they could to make it unpleasant for him—and I rather imagine from the action he took last March that they succeeded in their endeavor. Since he resigned his office in Washington, those manufacturers of impure foods and drugs have shown renewed activity, and this reminds me of the story of the little mouse that lived in a wine-cellar. One day a boy came down into the wine-cellar to draw some wine, and before departing did not turn off the spigot fully, so that a quantity of wine dripped on the floor. The little mouse soon afterward found a little pool of wine and tasted it. He liked it so well that he tasted it again, and after the wine was gone, the mouse, feeling pretty good, climbed up on the wine-keg, looked around, and said, "I wonder what has become of that blamed old cat that has been hanging around here for the last week." [Laughter.]

The Program Committee announced that I would speak on "Teeth and Health," and now that I have the floor, I want to say a few words on the status of the mouth hygiene movement before taking up the subject assigned to me by the committee.

PRODUCERS AND NON-PRODUCERS AS INFLUENCED BY HEALTH.

A socialistic writer recently observed that there are three ways of making a living—begging it, stealing it, or working for it; and furthermore, that since it was manifestly impossible to beg or steal something that does not exist, the workers of the world must first create the living which the beggar begs and the thief steals. I do not believe that I can divide humanity into beggars and thieves and workers, because there are some

people whom we cannot classify under any of these divisions, and so I would prefer to classify everyone as either producers or non-producers. Producers are those who contribute to the mental, physical, or material welfare of themselves and others. Men may differ in their classification of their fellow men as producers or non-producers, but in my mind this classification is perfectly clear. I believe that tramps, hobos, criminals, bankers, brokers, "middle men" of all sorts, and the men of the army and navy, so far as they are men of war, are non-producers, and I believe the rest of us are producers.

There are two kinds of producers, the direct and indirect. Direct producers are those who actually create things necessary to life, who grow products on or in the ground, or dig raw material out of the ground which can be converted into useful things. These are the agriculturists, the stock-growers, the miners and the artizans who take the raw material and convert it into clothing, houses, etc., for our citizens' comfort and well-being. There are a number of other people who do not directly produce, who do not create the materials necessary to life, but who are nevertheless necessary to our life, and in this class of indirect producers I would place all people who look after the health and intellect of the citizen. The physician and the dentist are indirect producers, because they enable the direct producer to produce to his fullest capacity, or at least to a fuller capacity than he would otherwise possess.

There are other men who are rightfully called indirect producers, because without their aid direct producers would not produce their full capacity. For instance, it is necessary that the direct producer be intelligent, that he may know how best to produce his product, and it is necessary for someone to teach him how to achieve this; therefore the pedagog is an indirect producer. Furthermore, in order that the direct and the indirect producers both may cultivate their intellectual capacity to its limit, we must have writers, musicians, and poets, all of whom are indirect producers who contribute to the mental welfare of the world. The distinction, therefore, between those who serve mankind, the producers, and those who do not serve mankind, the non-producers, can be quite sharply drawn.

The mouth hygiene movement is but a part of the grand, world-wide movement toward the bettering of the physical, mental, and material condition of the people, the increasing of the efficiency of our producers, and the decreasing of the number of our non-producers. The mouth hygiene movement, as the phrase implies, is especially concerned in the betterment of physical conditions, and is therefore intimately allied with the tuberculosis campaign, as well as all other movements toward better health. Physical incapacity reduces production more than any other one cause. It makes non-producers of those who should be partial producers, and partial producers of those who should be full producers. Perfect physical condition is necessary for anyone who would produce to his full capacity.

ORAL HEALTH AS INFLUENCING MAN'S EFFICIENCY.

I believe that but few of you are producing to your fullest capacity, are doing all you are capable of doing. I know I am not, and I doubt if any of you are, but the

more nearly we reach our full productive capacity, the more we add to the material welfare of the nation and of each individual in the nation. I have said that there is no one other factor which reduces the capacity for production more than ill health. It is true that a good many non-producers are not in ill health. Some non-producers are too lazy to work, others do not fit their groove in life—they went to dental colleges when they should have become streetcar conductors; but ill health is responsible for the largest number of our non-producers. Thirty per cent. of the unemployed are out of employment because of ill health, therefore the less ill health there is, the less will be the number of non-producers, and the greater will be the united product of the workers.

Among the many factors which produce ill health in individuals, limit and retard the output of their work, and are responsible for a large portion of these two classes of partial producers and non-producers, I believe the condition of the mouth to be a leading one. Let me give you my reasons.

METABOLIC DISEASES DUE TO ORAL CONDITIONS.

There are two classes or divisions of diseases which are largely influenced by the condition of the mouth. These are, first, diseases of faulty metabolism, or faulty nutrition, to use a more familiar term. Diseases of faulty nutrition are very largely due to oral conditions. Some of these diseases of faulty nutrition are due to the fact that the patient has not enough teeth to chew his or her food properly, while others are due to the fact that the condition of the patient's mouth is such that he is continually swallowing quantities of poisonous matter. Among the diseases due to faulty nutrition I might mention rheumatism, cancer, gout, gastritis, diphtheria, appendicitis, diarrhea, biliousness, constipation, arterio-sclerosis, diabetes, and various other manifestations of auto-intoxication. Three forms of food are necessary for the nurture of the body, viz, carbohydrates, proteids, and fats. The digestion of carbohydrates—viz, starchy foods, such as grain products of all sorts, potatoes, sugars, etc.—actually begins in the mouth by the action of the saliva upon the food. It is certain that if the digestion of these foods is not started properly, it will not be completed successfully.

For the digestion of proteids and fats, it is necessary that they be well divided and subdivided before passing into the alimentary canal and being acted upon by the digestive juices. The stomach has no teeth, as has been aptly said, and unless that comminution takes place in the mouth, it will be but imperfectly accomplished. So one can readily see how these diseases of faulty nutrition depend on the condition and use of the mouth. If a person has no teeth to chew food with, or if the teeth are in bad condition, digestion cannot be properly begun. If the mouth is in such a condition that the individual is taking into the stomach quantities of pus along with the food, digestion cannot properly be performed, and faulty metabolism results. Furthermore, even if the mouth is in good condition, and there are enough teeth to masticate the food, but the teeth are not used properly, diseases of faulty metabolism will occur. They frequently occur in patients who, although their masticatory apparatus is splendid and their mouth in fairly clean condition, bolt their food instead of chewing it.

INFECTIOUS DISEASES DUE TO ORAL CONDITIONS.

The second class of disease-producing factors especially under the control and influenced by the condition of the mouth —more so than the average person realizes—are the various infectious diseases. Five times as many micro-organisms pass into the lungs through the mouth as pass through the nose. The nose has a series of filters which sift the inhaled air and remove a great many micro-organisms even though they may be in the air when it enters the nares, but the mouth has no such protection; therefore many more micro-organisms reach the lungs through the mouth than through the nose. This, of course, is true to a greater degree of the stomach than of the lungs. Seventy-five per cent. of tubercular trouble is the result of infection through the mouth. Tubercular trouble occurring in the glands of the neck is claimed to be due either to infection from tubercular tonsils or from carious teeth and diseased gums. Pneumonia is another disease largely due to the condition of the mouth. It has been proved that the tubercle bacillus and the pneumococcus will exist in carious cavities in teeth for forty days; therefore if cavities are present in the teeth, it may readily be seen what the effect may be if the patient's health deteriorates at any time during these forty days. Dr. Evans has told about the epidemics of scarlatina which had to be combated in the schools of Chicago; of the children who had to be sent away and quarantined until they were well, and how, when they were allowed to return, the epidemic of scarlatina broke out again. For a long time the cause of this recurrence could not be determined, until the sterilization of every mouth and the filling of every cavity in the teeth was insisted upon before these children were permitted to return to school; and in that way the epidemic was stopped. The school authorities of Valparaiso, Ind., have had the same experience.

Typhoid fever is another disease in which the condition of the mouth plays a large part. In a neglected mouth with carious teeth, food débris collects around the teeth, and the opportunity for the cultivation of the typhoid bacillus in such a mouth is great. On the other hand, a person may harbor innumerable typhoid bacilli in the mouth without being harmed, if he has no carious teeth and if his physical condition is perfect. Some of these bacilli will probably pass into the stomach, but if the person's condition is perfect his physiological resistance will be sufficient to throw them off, as the field is not ripe for them. But inside of ten, twenty, or thirty days this same person's condition may change so that the typhoid bacillus finds the alimentary canal an easy field in which to propagate, and then typhoid fever may be the result. So a person may have typhoid fever two or three weeks after having been exposed to it, if the state of the mouth favors retention of the bacillus. The condition of the mouth, therefore, is of serious importance in stamping out the different contagious diseases. A neglected, septic mouth, with carious teeth in which food is constantly putrefying, will bring about an inflammation of the mucous membrane the effect of which will be felt by the mucous membrane of the throat. The membrane becomes inflamed, the physiological resistance is depreciated by the presence of these conditions, and the

result is that the diphtheria bacillus finds a favorable field upon which to grow and propagate. In the same way a great many other of these infectious diseases may be produced through infection in the throat.

UNCLEAN MOUTHS A MENACE TO THE COMMUNITY.

I would impress upon you, then, that the condition of the mouth and of the teeth is not a matter of only local importance. It affects the individual's whole body, and not the mouth alone. Its influence goes even farther than that. I believe honestly and earnestly that the time will come when the condition of a person's mouth will be taken as much into account by the municipal authorities as the condition of his morals is taken into account to some extent today. The time will come when no one will be allowed by the municipality to carry around an immoral mouth, as it were. This is only a question of the *mores,* of the custom of the time. At present the opinion prevails that the condition of a person's mouth is his own private affair, and if you went up to a man on the street today and told him that his mouth was a menace to the community, and he must either clean it or go to jail, he would probably knock you down or consign you to a place which is even hotter than Washington—if any such place there be. The time is coming when a dirty, immoral mouth will be considered as much a menace to the community as an infectious disease, and the person with such a mouth will be quarantined the same as the person who has smallpox. And that is the thought I want to leave with you—that the condition of a person's mouth is not only of importance to that person, but is a matter of moment to the community at large; that a dirty, uncared-for mouth is not only a source of disease to the individual, but also a menace to the health of every person who comes within a reasonable distance of him. When viewed in that way, it can readily be seen that the condition of your mouth is not only your business, but is my business, and everybody's business; it is the business of the community.

Dr. J. P. Buckley. Mr. Chairman, I move that we extend a rising vote of thanks to Dr. Wiley, and also wish to include Dr. Hunt, the singers, and others who have taken part in the program.

The audience then rose as a vote of thanks to those who had taken part in the meeting.

Section III was then declared adjourned *sine die.*

THE CLINICS.

Chairman—C. J. Grieves, Baltimore, Md.
Secretary—S. W. Bowles, Washington, D. C.

MISCELLANEOUS.

Dr. C. M. McCauley, Abilene, Texas. "The Use of the Black Micrometer and Dynamometer for Testing Amalgams."

A duplicate of the amalgam micrometer invented by Dr. G. V. Black was exhibited, together with fillings made from twenty-five of the most popular alloys used by the profession. Some of these fillings showed shrinkage sufficient to render them worthless, while others showed expansion, some as high as 300 points and over. Only a very few remained unchanged in the cavity—*i.e.* showing neither shrinkage nor expansion.

Dr. D. H. Young, Attica, N. Y. "Surgical Treatment of Prominent Alveolar Process Before Introducing Artificial Dentures."

The advantage of this treatment is that it enables the dentist to get rid of all objectionably prominent portions of the process and undesirable undercuts, this operation, in many cases, not only transforming the patient's appearance from an unsightly to a pleasing and intelligent one, but adding much to the credit of the dentist's operation.

If a case of this kind is treated without some such surgical intervention, the dentist is sure to be criticized for the ill appearance of his patient.

Dr. W. F. Andrews, Springfield, Mass. (I) A Simple and Effective Method of Restoring Worn-down Teeth and Replacing Missing Ones." (II) To Replace a Missing Tooth."

(I) To restore worn-down teeth, the cutting edge of an incisor or canine is ground to a smooth surface, then two holes, of 22 gage, are drilled parallel with the pulp without encroaching on it. Gold of 22-karat is burnished to the surface, after having fitted platinum pins in the drilled holes; the gold and the pins are fastened together with hard wax, removed, and soldered. Next the piece is applied in the mouth, given a second burnishing and trimmed to the tooth. It is then removed, sufficient solder is added to restore the length, and the appliance is finished and fastened with cement.

(II) The occlusal surface of a molar or bicuspid is ground so as to allow sufficient space for gold, then the same procedure is followed as for a worn-down tooth, or pins are inserted, a wax

model is made, and an inlay cast. This is placed in position, removing the appliance with the impression, and then the usual procedure for fastening to it the missing tooth is followed.

Dr E. A. Schillinger, Lee, Mass. "Gold Fillings in Artificial Teeth."

The first step in the preparation of the cavity is to grind a concave depression with a large-sized carborundum stone. Following this, grooves are cut on the margin of the cavity with small-sized stones. On the lingual side of the tooth dovetailed grooves are ground at obtuse angles to the cavity.

The filling is started by placing a small portion of cement in the bottom of the cavity. While this is still soft, a piece of gold is inserted, waiting until the cement sets before finishing the filling.

To hold the tooth to work on, a hole is cut in a large cork, and around it waxable rubber is built.

This work is done entirely without the use of diamond drills.

Dr. J. M. Levy, New York, N. Y. "Radiography as a Regular Part of Office Practice, and as an Aid in the Extraction of Impacted Third Molars."

The case presented for impacted third molar operation was one of simple maleruption of the lower left third molar. In regular practice the operator would most certainly not extract such a tooth. The patient's dentist, who accompanied her, however, and the patient herself, insisted upon its extraction. The tooth was extracted under local anesthesia with alypin 2 per cent. and adrenalin 1:1500, by the use of ordinary cowhorn forceps.

Dr. Levy also showed a new film-holding device for making radiographs, and explained his method of taking and developing radiographs.

Dr. Gustavus North, Cedar Rapids, Iowa. "Method of Reading Temperaments."

Temperaments are individual peculiarities of mental and physical structure; they are the index to the peculiarities of the individual as the tongue is the index to the physical condition of the system.

Classification of the basal temperaments by the complexion is a strongly marked distinction, especially with the nervous and bilious. The color of the hair and eyes are sometimes confusing with some temperaments.

Nervous temperament. Body slender, well developed, light complexion, hair and eyes light or dark. Teeth pearl blue or gray in color, rather long, considerably narrower at the neck than at the cutting edge, with long bite; occlusion close and firm.

Bilious temperament. Spare, angular development, dark complexion, hair and eyes dark. Teeth of yellowish color, slightly narrower at the neck than at the cutting edge, long in proportion to the width, generally long bite; occlusion close.

Sanguine temperament. Generally well developed, fair complexion, hair generally brown, eyes blue or gray. Teeth cream color, about the same width at the neck as at the cutting edge, with medium bite; occlusion moderately firm.

Lymphatic temperament. Bulky development, pallid complexion, hair and eyes light or dark, hair thin and straight. Teeth rather dark, clouded in appearance, generally large and broad,

with medium bite; occlusion loose and flat.

There are four basal and twelve or more dual or mixed temperaments. Most persons represent two or more temperaments.

Dr. A. H. Corbett, Atkinson, Nebr. "Scalers for Personal Use."

The clinician demonstrated a method by which a person can thoroughly scale his own teeth by the use of a set of scalers, such as Nos. 3 and 4 of Dr. King's set made by the S. S. White Co. These instruments, he said, are especially indicated when the patient cannot return for subsequent treatments. The patient is instructed in the use of the scalers, which are to be used in conjunction with a good antiseptic mouthwash.

OPERATIVE DENTISTRY.

Dr. L. S. Breed, Boston, Mass. "Removing Pulps, Preparing and Filling Root-canals."

The pulp is first removed under pressure anesthesia. Extremely small canals are enlarged to a size which will allow of their being properly filled, and the canal is filled by first pumping it full of chloroform with the aid of a broach, after which properly selected, stiff gutta-percha canal points are inserted.

Dr. C. G. Hughes, Pittsburgh, Pa. "Painless and Quick Removal of Pulps and Immediate Canal Filling."

The tooth operated upon in this clinic was an upper right third molar, with a saucer-shaped cavity and slightly exposed pulp, though the tooth had never ached. The cavity was washed out with dioxid, after which the pulp was anesthetized by the use of a half-tablet of cocain and adrenalin. The preparation was first worked over the cavity with a pointed explorer, and an opening made directly into the pulp. Another application of the cocain and adrenalin was made directly to the pulp, producing pressure anesthesia by the aid of soft plate rubber. Proper opening was then made, and the pulp removed from the chamber and canals. The canals were next reamed, and after drying properly, the upper fourths of the roots were filled with Oxpara, being pumped up into the root-canals with a broach. A small pellet of cotton was next inserted, and the Oxpara forced to the apex of the root. The canals were then filled with gutta-percha, and a permanent filling was placed over this.

Dr. Robert Purvis, Camden, N. J. "Ascher's Artificial Enamel."

This clinic consisted in the insertion of two artificial fillings, one being a large contour filling in an upper lateral, placed over a capped pulp, the other a restoration of the labial cusp and surface of an upper bicuspid.

Dr. Simon Shapiro, Brooklyn, N. Y. "A Method of Separating Teeth by the Use of Silk Ligatures."

By means of dental floss, a double ligature of French silk or very thick darning silk is drawn through the interproximal space below the point of contact, and tied over the morsal edge, forming a loop lingually and a knot labially. The swelling of the French silk, caused by the absorption of moisture, will in the course of a day or two separate the teeth, and afford sufficient space for almost any dental operation.

Dr. F. E. Ball, Fargo, N. D. "Treatment of Putrescent Pulps."

The cavity is first flooded with the following preparation:

Creasote (beechwood),	
Formaldehyd 40 per cent.,	
Alcohol,	āā ℥j
Thymol,	
Menthol,	āā ʒss
Lysol,	gtt. xxx

The canal is then carefully excavated and prepared, keeping the medicament in advance of the instruments. A portion of the medicament is sealed in the tooth for forty-eight hours. At the next sitting this dressing is removed, then a paste is made by adding powdered zinc oxid to the liquid prescription, and as much of this paste as possible is carried into the canals of the tooth, forcing it to the end of each canal and filling the latter with gutta-percha points.

This paste formula is useful in all canal work, and is heartily recommended by the clinician.

Dr. John H. Kennerly, St. Louis, Mo. "Filling Root-canals with an Improved Paraffin Compound."

The root-canal is thoroughly dried with acetone, bibulous paper cones, and a hot wire. The canal is then coated with a very thin film of pure paraffin oil and a cone of the prepared paraffin compound is melted into it by means of the electrically heated root-dryer. The source of electricity may be obtained from the electric light supply current, after it has been passed through a suitable switchboard, or from a series of from 6 to 8 dry-cell batteries. This method is fully described in a paper by Dr. Hermann Prinz entitled "Filling Root-canals with an Improved Paraffin Compound," published in the *Dental Cosmos* for October 1912, p. 1081.

Dr. J. W. Bryan, Nashville, Tenn. "A Method of Treating Pulpless Teeth."

Treatment of pulpless teeth by the use of equal parts of cresol and formalin is recommended, in the following cases:

(1) When the pulp has been extracted, regardless of the method of anesthetization or devitalization employed.

(2) When the pulp has died and but little, if any, apical pericementitis is present.

(3) When there is decided apical pericementitis, or when pus is present but no fistulous opening has formed or can be made as yet.

(4) When there is a fistulous opening, or when such can be made.

The clinican discussed the subject according to the above analysis, and gave reports of the most satisfactory results following the treatment demonstrated.

Dr. John H. Bristor, Mansfield, Ohio. "Three Helpful Hints."

A pulp capping for filling deciduous teeth where the pulp is close, and for fillings where metal is not indicated, may be made by adding one or two drops of beechwood creasote to the liquid of the oxyphosphate cement, mixing the liquids together before incorporating the powder.

A stainless counter-irritant consists of—Tinct. iodin, 3 parts, tinct. aconite, 3 parts, aqua ammonia, 1 part. (The first two form the official preparation.)

Glass saliva tubes, glass cement slabs, and all pieces of glassware are easily cleaned by immersing in a dilute solution of muriatic acid, then rinsing in clear water.

Dr. J. E. Tibbetts, Rockland, Me. "Filling of Mesio-bucco-distal Cavities,

under the Gingival Margin, Extending Too Far for Ligatures or Clamps."

The rubber dam is applied without ligatures or clamps over the teeth of a human skull. The dam is held in place above the cervical margin by an elevator, the cutting edge of which has been altered, by one hand of the operator, while he manipulates the filling material with the other hand. The advantages of this method are saving of time, less pain to the patient by less laceration of gum tissue, and preservation of the gingival margin.

Dr. J. Austin Dunn, Chicago, Ill. "An Improved Method for Cleaning Teeth by Means of Rubber Cones."

These rubber cones are submitted to the dental profession as an improved means of cleaning the teeth, and for the purpose of meeting the modern requirements of prophylaxis and sanitation.

The fine feather-edge on these cones will admit of a close contact and thorough cleaning of the gingival borders and angles of all the teeth, and they are sanitary because, having been once used, they are thrown away.

Their use on the right-angle handpiece is especially new and satisfactory for cleaning the buccal and lingual surfaces of the teeth. These cones are very easily and quickly mounted on a cross-cut fissure bur No. 4.

Dr. Frank J. Ryan, Chicago, Ill. "Amalgam Fillings."

The clinician showed six cards of amalgam fillings, fifteen to each card, showing—(1) Amalgam fillings as they are after failure, the defects being easy to see and avoid; (2) amalgam fillings as made by the clinician in cavities in human teeth and ivory blocks, all made under ideal conditions, showing the reasons for failures of amalgam fillings; (3) a card of fillings made by other operators, showing that some operators do better work than others, but that none can make even a good filling with amalgam alone; (4) a card of fillings made in glass tubes, some with soft cement linings that looked splendid, and others with amalgam alone that did not look as though they would arrest caries in a tooth.

Dr. Edward S. Gaylord, New Haven, Conn. "Rapid and Positive Method of Obtaining Gold and Platinum Matrices."

The gold or platinum is placed between a fold of thin China silk, which is immersed in water to make the silk and metal better conform to each other. With ball-nosed foil-carriers the combination is held over the cavity, while with a round-ended instrument in the other hand it is carried promptly to the floor of the cavity, and held there. With foil-carriers the folds are pulled out until a pellet of wet cotton, spunk, or bibulous paper can be packed in so as to swage the matrix and make it conform to the cavity. The silk is then removed carefully from the cavity, then the partially formed matrix is returned to the cavity for completion, by packing dry pellets of cotton, spunk, or bibulous paper firmly into the cavity until the matrix is perfectly adapted to it. The margins are also carefully adapted by a burnisher or roller, Pierson's rollers being preferred. The cotton or spunk is removed, the matrix in the cavity is filled with softened wax or gum camphor, and with a small heated copper wire, inserted in the wax, the matrix is removed from the cavity. It is then invested in Jenkins' or Pelton & Crane's

investment No. 1, a pellet of absorbent cotton is placed on the wax, which, on heating slowly, is taken up in the cotton. The matrix is then ready to receive the porcelain for the bake.

Dr. V. M. Rundle and Dr. H. I. Beemer, Newton, N. J. "Preparing and Inserting a Gold Filling in a Cavity in the Approximal Surface of a Bicuspid by Dr. Black's Methods."

The cavity filled was in the distal surface of an upper right first bicuspid. It was prepared after Dr. Black's method of extension for prevention. The buccal, lingual, and gingival margins were extended to areas of greatest immunity, and an occlusal step was made for anchorage. The gingival and occlusal seats were made flat, and all opposing walls parallel.

The gingival third of the approximal portion of the cavity was filled with unannealed gold cylinders, specially rolled for this purpose as taught by Dr. Black, and the rest of the filling was made of annealed gold pellets, also specially prepared for this use after the methods of Dr. Black.

The hand mallet was used for condensing the gold, and special cutting instruments were employed for preparing the cavity; the pluggers were also specially designed for this work. All the instruments used were manufactured from models made by Dr. Black, Dr. Wedelstaedt, and Dr. Conzett.

Dr. W. R. Clack, Mason City, Iowa. "Gold Foil Filling in the Disto-occlusal Surface of an Upper Bicuspid or Molar by Dr. Black's Method."

In preparing his operation, Dr. Clack removed two amalgam fillings, one from the occlusal, the other from the mesial surface of an upper right second bicuspid. He then squared the cavity as much as possible without going to the full depth of the center, or pulpal wall.

After the cavity had been completely prepared, the first step in the operation consisted in placing three cylinders of gold against the cavity margins, one on the buccal, one on the lingual, and one on the gingival wall, the last binding the former two in place. These pellets or cylinders consisted of one-quarter sheet of No. 4 soft gold, the same quality of gold being used for the entire gingival third of the filling. At this point, the clinician began to anneal his gold, which thereafter consisted of loosely-rolled pellets containing from one-sixty-fourth to one-sixteenth of a sheet each. The entire work of placing the filling was done either by hand pressure or hand mallet, the latter being wielded by an assistant.

The points that Dr. Clack desired to emphasize in his finished filling were the production of an accurate contact point and the shaping of the filling so that food, in its excursion from the occlusal surface of the tooth toward the gum, would be brought in contact with both the buccal and lingual margins throughout their length, thus mechanically assisting in keeping the margins polished. This condition was produced not so much by extensive cutting as by the shaping of the filling and a narrowing of the contact points.

[This report was made at Dr. Clack's request by Dr. Alfred P. Lee, Philadelphia. Pa.]

Dr. C. L. Brininstool, Rochester, N. Y. "Vapor Bleaching."

Vapor bleaching is accomplished by the use of 25 per cent. pyrozone, the

vapor being generated by the application of heat.

For bleaching the marginal or cement line of a porcelain inlay, the rubber dam is applied to protect the surrounding tissues, as in all cases where this method is used. Then a pledget of cotton moistened with the solution is placed over the margin, and heat is applied in order to vaporize the solution by means of a flat instrument or one that conforms as nearly as possible to the surface to be bleached. The electric wax spatula answers this purpose nicely, as it generates just about the proper amount of heat.

For bleaching an anterior tooth the moistened cotton is placed in the cavity, and the heat is applied with an instrument that closes the cavity as nearly as possible, the object, of course, being to retain the vapor so that it will be forced into the tubuli of the dentin. Care should be taken to seal the point of the root carefully, so that no vapor will be forced through the apical foramen. If the opening be only a small and round one, where the pulp-chamber has been entered, it is quite a simple matter to vaporize the pyrozone with a short, tapered root-canal drier, which can be made to close the opening quite effectually. Care should be taken not to use an instrument that is too hot, or the vaporization will be so rapid that a mild explosion will take place. Other methods of applying this principle will suggest themselves, the object being to confine the pyrozone vapor so that it will be forced into the tubuli and be brought in contact with the material to be bleached.

Dr. J. Fremont Burket, Kingman, Kans. "The Filling of Root-canals."

If a patient presents an exposure, the pulp is removed, the cavity and canals are washed and thoroughly cleansed with hydrogen dioxid, and the canals dried with bibulous cones made by cutting little triangles from sheets of bibulous paper and twisting them into cones, made of any size so as to suit the case. This procedure is followed by applications of hot air to the canals. After the canals are thoroughly dried, a little powdered iodoform is placed in the pulp chamber, and with a small plugger a little of it is worked into the canals. Then a gutta-percha point is selected, small enough to be gently carried to the apex of the canal, and if more than one canal is present, a point is placed in each; then, with a small drop syringe, made of a little glass barrel with a platinum point and a rubber bulb, a drop of chloroform is dropped upon the gutta-percha point, which drug will immediately follow the gutta-percha point to the apex and dissolve it. As soon as this point is dissolved, another gutta-percha point is introduced into the canal, thereby forcing the first gutta-percha, which has now been changed to chloro-percha, into the recesses of the canal. This is repeated till all the chloroform is evaporated, and the canal is filled.

If the case is one of a dead pulp, the pulp chamber is opened freely so as to make the opening large enough to allow free access to all canals, and all decayed matter is removed. Then the cavity, pulp chamber, and root-canals are washed out with dioxogen and the canals filled as indicated above.

If the case is one with a fistula, the process described is followed until the pulp chamber and canals are thoroughly cleansed, then a small ball of vulcanite

rubber is placed on a "sub Q" syringe point, to cork the cavity in the tooth and prevent back flow, and a syringeful of dioxogen is forced through the canal and fistulous opening. This is repeated till the fistulous tract is thoroughly cleansed, two or three applications usually being sufficient. Then the root-canals are filled as described above.

The clinician demonstrated the method of filling roots as above described by the use of glass tubes, prepared for this purpose, permitting of an accurate observation of the results of the process employed, the tubes being made to approximate root-canals of different sizes.

ANESTHESIA.

Dr. A. E. Smith, Cleveland, Ohio. "Nitrous Oxid and Oxygen for Producing Prolonged Analgesia and Anesthesia."

Deep analgesia was produced in several patients in whom, during this condition, hypersensitive cavities were excavated and prepared without pain. At no time were the patients unconscious, as only the sensory nerves were acted upon. During the analgesic state, patients are fully conscious and can talk, but have no sense of pain. The patients were kept in the analgesic state for from three to thirty-seven minutes.

Dr. R. H. Riethmüller, Philadelphia, Pa. "Local Anesthesia with Novocain-Suprarenin."

The clinician demonstrated the use of novocain-suprarenin for local anesthesia in dental operations, the methods of injection, the preparation of the most serviceable and safe solution, the instrumentarium required and its sterilization; and the prophylactic treatment of patients. Statistics were given as to the very successful employment of local anesthesia by means of novocain-suprarenin in dental as well as in minor and major surgical operations as practiced in European countries to such an extent that general anesthesia has been assigned second rank. The four methods of injection available for dental operations—viz, terminal, conductive, peridental, and intraosseous anesthesia—were demonstrated by means of large anatomical drawings and a natural skull, in which the oral tissues had been replaced in wax. The preparation of an isotonic, so-called "normal" novocain-suprarenin solution, as indicated by Dr. G. Fischer of Marburg, and its sterilization by boiling, was shown, preference being given to the tablet form of the anesthetic mixture over ampules containing ready-made solutions. Precautions necessary for keeping the drugs free from decomposition by air, light, and traces of alkalis, for making an isotonic sodium chlorid solution, and for obtaining absolutely sterile distilled water were pointed out. The instrumentarium demonstrated consisted of several syringes, all-metal and glass-and-metal of various makes, as well as hypodermic steel needles of various diameters, lengths, and makes, a glass jar fitted with a German-silver stand for the convenient preservation of two fully mounted syringes in a 70 per cent. alcohol solution, which is burned off the syringe and needle before use, or in a saturated boric acid solution, for the sake of sterility; a small porcelain pan for boiling and thereby sterilizing the solution to be injected; an electric sterilizer for

sterilizing the syringe and needles after use, and a syringe tray for holding the sterilized instruments temporarily. Samples of synthetic drugs most useful in preparing the patient for the injection and divesting the injection of even the minutest trace of subsequent intoxication —viz, pyramidon, trigemin, and bromural—and precautionary preparations for the counteracting of possible shock in mild form—viz, strong black coffee, camphorated validol, and amyl nitrite—were exhibited. The advantages of novocain—the fact that it is not a nostrum like innumerable other substitutes for cocain, its low toxicity, which is from seven to ten times less than that of cocain, the confinement of the anesthesia to a small area produced by the admixture of suprarenin, its low price, its sterilizability by boiling, its compatibility with vital tissue, the absence of after-pain, inflammation, and necrosis following its employment, and its universal usefulness in dental practice, ranging from the desensitization of hypersensitive dentin and devitalization of pulps to the painless resection of the whole mandible—were emphasized. To prove his absolute faith in this ideal local anesthetic, the clinician had Dr. Potter of the Harvard University Dental School make a buccal and lingual injection for the anesthetization and subsequent excavation and filling of an extremely hypersensitive cervical cavity in an upper second bicuspid, the vitality of which has been fully preserved.

Dr. E. O. Whipple, Olean, N. Y. "Cocain Anesthesia Without Pressure."

After removing the loose carious portions present, a pellet of cocain and adrenalin is placed as near the pulp as possible, sealing it in with hot temporary stopping. It is left for from fifteen minutes to one hour, depending on other work to be done. Then as much of softened dentin and of the pulp is removed as is possible without pain, and the operation is repeated, leaving the dressing for fifteen minutes more. If at the end of that time the pulp is not thoroughly anesthetized, the process is repeated a third time.

As a rule, other work is to be done for the patient, so no time is lost. Otherwise the patient can wait while the operator works on another patient. The more the pulp is inflamed, the more time is required for the production of thorough anesthesia.

Dr. J. A. Bliss, Ruthven, Iowa. "Instruction in Somnoform Analgesia Induction, Using the DeFord Appliance."

A number of patients were put into an analgesic state, also several dentists inhaled the somnoform for the sake of personal experience as to the amount necessary, the depth of analgesia required, and the technique involved. Some who had cavities which elicited pain upon the slightest touch of a toothpick or instrument volunteered to take somnoform. Two or three inhalations were found to be sufficient to render the dentin insensitive to pain when touched with instruments.

Stress was laid upon the small amount of somnoform vapor necessary in inducing the analgesic stage as compared with the air used. In one case only was anesthesia induced for the purpose of showing that the anesthetic stage is but a step from that of analgesia and can be induced with no discomfort whatever

to the patient. Several dentists who had never had an analgesia appliance in their hand before, and an assistant of one of the local dentists, induced analgesia in patients without difficulty. The DeFord appliance is so constructed that the anesthetic agent can be controlled absolutely and scientifically.

Dr. H. E. Tompkins, New York City. "Anesthesia in Oral and Dental Surgery."

The clinician presented an anesthetic apparatus with which it is possible to administer any combination of anesthetics in any desired proportions. Its particular use in dentistry is realized in analgesia, for any desired percentage of air, N_2O, and O, either singly or in combination, may be administered with this apparatus. It also presents a regulating feature by which the flow of gas is under absolute control, ranging in pressure from zero to 10 pounds. Because of the lack of material, this apparatus was not put to a practical test at this meeting.

There was also presented a new capsule of aromatic ammonia, containing 10 drops, which is wrapped in a layer of absorbent cotton, this in turn being wrapped in a sheath of silk cloth. The preparation is known as Vaporole Ammonia, and is useful in all cases where a disposition to faintness is manifested.

Dr. Frank L. Platt, San Francisco, Cal. "Peridental Anesthesia."

The clinician demonstrated a method of injecting a local anesthetic into the cancellous tissue of the alveolar process, thus anesthetizing the peridental membrane and rendering the tooth insensitive to operative procedures. The anesthetic used was a preparation of novocain and adrenalin.

The region to be operated upon is first thoroughly cleansed by means of any good antiseptic mouth-wash applied with an atomizer, particular attention being paid to the interdental spaces and the free margins of the gums.

The point on the gum where the puncture is to be made is then painted with tincture of iodin and well swabbed with a pledget of cotton saturated with the antiseptic used in the atomizer.

An all-metal hypodermic syringe with a short, sharp 28-gage needle is used. Pressure is made on the gum with the finger to render it somewhat insensitive, and the needle is inserted slowly and gently, beginning the injection of the anesthetic as soon as the needle touches the tissue, in order to keep the anesthetic always ahead of the needle.

No pain need be inflicted either in this or any subsequent part of the operation.

The needle is inserted until it reaches the bone of the interdental septum next to the tooth or between the teeth to be operated upon, and just above the base of the interdental flap. It is then driven through the hard outer plate of the process by light taps on the piston of the syringe, stopping between blows to exert pressure and inject the anesthetic into the tissue. Should the needle become clogged, the obstruction may usually be removed by withdrawing the syringe and striking sharp, heavy blows on the head of the piston.

After the needle has been cleaned, or a new one has been adjusted, it is again inserted in the previous puncture, and the process is repeated. When the cancellous tissue is reached, the injec-

tion should be made slowly and gently, with but little pressure.

From one to two or even three teeth may be anesthetized with one injection, though more than one puncture may be required for a single tooth, in portions where the bony tissue is more than ordinarily dense. Where difficulty is experienced in driving the needle through the hard outer plate of bone, the latter may be punctured by means of a No. 1 half-round bur in the engine handpiece, after anesthetizing the gum at the spot where the puncture is to be made.

The bur must be sterile and dipped in vaselin to avoid winding the membrane on it, and should be revolved slowly and with little pressure to avoid heating. The outer plate of bone having been punctured, the syringe is used with a conical needle, which may be made from an ordinary hypodermic needle by grinding the reinforcement down to a long tapering point, and cutting the needle off close to the point of reinforcement. After this conical needle is inserted in the puncture made by the bur, the syringe should be held firmly in position, and the anesthetic deposited in the tissue by slow, gentle pressure.

When the bur is used, the puncture should be made between the teeth, if they be single-rooted, or between the roots if the teeth be molars, from one-half to two-thirds of the way from the gingival border to the apices of the roots of the teeth.

In the case exhibited, the needle was driven into the process between the upper right first and second bicuspids, and the pulp was removed from the first bicuspid "without a bit of pain"—as the patient remarked. This intra-osseous injection of an anesthetic will render any dental operation, even the extraction of impacted third molars, positively painless, and marks an important advance in modern, ethical painless dentistry.

Dr. Emerson R. Sausser, Philadelphia, Pa. "Subperiosteal Injection of Novocain in Preparing Two Hypersensitive Cervical Cavities. (According to Dr. Guido Fischer.)"

The patient presented two intensely sensitive cervical cavities of the erosion type, the affected teeth being the upper left lateral incisor and canine.

The technique employed by the clinician was as follows:

Complete sterilization of the field of operation and the instruments used, and the solution then injected.

One cubic centimeter or sixteen drops of distilled water was prepared, in which one of Prinz' novocain tablets was dissolved. The formula of this tablet was suggested by Dr. Hermann Prinz, and is as follows:

Novocain,	gr. 1/3
Thymolated adrenalin,	gr. 1/1500
Sodium chlorid,	gr. 1/8

This tablet, when dissolved in the above amount of distilled water, gave a 2 per cent. isotonic solution of novocain. The Parke-Davis dental syringe improved, with a short hub and a medical Schimmel hypodermic needle, was filled with the above solution.

The mucous membrane was painted with iodin and the needle was inserted directly over the root of the upper left central at a point between the gingival and the apical regions, where one drop of the solution was injected, after which the needle was passed under the perios-

teum in a direction toward the apex of the lateral, viz, the tooth to be anesthetized, where six minims of the solution was injected. After fifteen seconds had elapsed, the needle was withdrawn and the finger quickly placed over the point of insertion to prevent the escape of the solution. After a few seconds the parts were massaged.

The mucous membrane on the palatal side in the apical region of the lateral incisor was painted with iodin and an injection of four drops of the solution made into the subperiosteal tissue at this point; the needle being withdrawn, the finger was placed over the point of the insertion and the parts were massaged. In three minutes complete anesthesia was established and the tooth was ready for painless excavation of the cavity and extirpation of the pulp.

In anesthetizing the canine the same technique was followed, excepting that the point of inserting the needle was midway between the gingival margin and the apex of the lateral incisor, and the needle was advanced toward the apex of the canine.

Dr. S. G. Wallace, Lakewood, N. J. "The Immediate Cutting and Grinding of Hypersensitive Dentin in Dental Operations."

The clinician demonstrated the use of his obtundent in the preparation of an upper second bicuspid for a jacket porcelain crown in a male patient of about twenty-five years of age and nervous temperament. Dr. W. A. Capon of Philadelphia, who later applied the crown, directed and assisted in the preparation. The hypersensitive tooth structure and the stones and burs were kept wet with the obtundent during the operation, and the grinding and shaping of the tooth was completed in about twenty minutes. After the application of the obtundent, the tooth structure was completely desensitized, and the patient stated that he experienced no pain during the operation. While cutting the tooth under the gum with an Evans' tooth trimmer up to the alveolar ridge, there was not the slightest indication of pain. This method also afforded a great saving of time.

The two succeeding demonstrations showed the use of the obtundent in removing hypersensitive dentin and in cavity preparation. The first patient to be operated on was a young man of nervous temperament, who presented a large, extremely sensitive cavity in the occlusal surface of the lower right second molar with a nearly exposed pulp. After carefully removing the débris, a pledget of cotton saturated with the obtundent was placed in the cavity and allowed to remain for ten minutes. The operation proceeded then without delay, the burs being kept wet in chloro-carbolin while in motion. The fully prepared cavity was examined and found to be thoroughly excavated even in the portion overlying the pulp chamber, without an exposure having been produced. The pulp was then capped with one part of chloro-carbolin and two parts of Harvard liquid, rubbing up the two and drawing in powder to make a cream-like paste. The entire operation was completed in less than one-half hour; the patient showed no signs of pain, and stated that he felt no discomfort whatever in the operation.

In the other case, the cavity to be excavated was situated in the disto-approximal surface of an upper right

bicuspid, the tooth structure being broken down around a gold filling near the gingival margin. This cavity was unusually sensitive and difficult to work on without a right-angle attachment. Cotton saturated with the obtundent was placed around the gold filling and held there for ten minutes; the gold filling was removed in the usual way, and, as sensitiveness presented, the use of the obtundent was repeated. This operation was performed on a dentist who was attending the convention, and who expressed himself as being delighted with the absence of even the least discomfort, as he had expected to be hurt unmercifully.

PYORRHEA ALVEOLARIS.

Dr. R. G. Hutchinson, Jr., New York City. "Surgical Treatment of Pyorrhea. Final Scaling and Curetment."

This surgical treatment was applied to nine lower anterior teeth which were greatly involved. The treatment was completed at one sitting, with the exception of final polishing with pumice.

Dr. Elbert J. Weaver, Milwaukee, Wis. "Surgical and Systemic Treatment of Pyorrhea Alveolaris."

The clinician showed a method of instrumentation in two lower centrals affected with pyorrhea pockets. He also gave an exhibition of urinalysis charts, showing constitutional conditions to be found in pyorrhea cases, with suggestions as to the improvement of these abnormal conditions, in conjunction with the surgical treatment. The clinician also showed results obtained in one case particularly.

Dr. J. M. Gompertz, New Haven, Conn. (I) "Bacteriology and Vaccine Therapy of Pyorrhea Alveolaris." (II) "The Making of Autogenous Vaccines."

The clinician showed pure cultures of from 24 to 48 hours' growth in agar, milk, and potato, of staphylococcus albus and aureus, streptococcus, and pneumococcus, with cultural features.

He also showed fifty pure cultures of different bacteria found in pyorrhea alveolaris cases, on slides stained by the Gram method, as seen under the microscope, also suspensions of definite quantities of bacteria killed by heat in a 0.9 solution of sodium chlorid. He demonstrated a method for the determination of bacteria by the Thoma-Zeiss blood-counting chamber, also the initial step in the making of an autogenous vaccine, the finished product, and the method of inspection.

Dr. Clyde M. Gearhart, Washington, D. C. "Pyorrhea Case."

This clinic consisted in the exhibition of a well-defined case of pyorrhea, the patient having been dismissed only three months previously by a dentist who had completed the operative work, but neglected the manifest pyorrheal condition, assuring the patient that his mouth was in a healthy condition. The clinician treated the upper and lower left side, and presented the results obtained by him in comparison with the opposite neglected side.

Considerable stress was laid upon the fact that, as in this case, many mouths that are in a similarly precarious condition are being slighted by dentists, and patients are being dismissed under the impression that their mouths are in a normal state.

Dr. Moore Stevens, Atlantic City, N. J. "High-frequency Current in the Treatment of Pyorrhea Alveolaris and Congested Conditions of the Oral Cavity."

In May 1911, the clinician, not receiving as quick results as he desired in the treatment of pyorrhea alveolaris, applied a high-frequency current directly upon the gums, thinking that the stimulating results, if the patient could tolerate them, might be beneficial in more quickly healing the gums. The patient and the operator were more than pleased after a few treatments, as the excessive stimulation of the gums removed all congested blood in these tissues. As the patient was using care to keep his mouth in a sanitary condition, it was restored to a healthy state in much less time than was possible with the medicinal treatments previously used.

High-frequency currents possess therapeutic power in passing through tissues in which vitality has almost been exhausted. These currents appear to promote circulation, increase metabolism, and more or less completely restore general harmony in the part.

With the proper application of this current, relief from pain can also be brought about in the treatment of toothache, tic douloureux, painful eruption of teeth, gangrene, sensitive teeth during menstruation, ulcerated gums, neuralgia, in fact any congested condition of the oral cavity.

Dr. Jules J. Sarrazin, New Orleans, La. "New Riggs' Instruments. Preventive and Corrective Local Adjuncts."

Dr. Sarrazin demonstrated the use of a new set of instruments for the surgical treatment of Riggs' disease, in which six of the points are original, viz, Nos. 3, 4, 5, 6, 7, and 8. These six instruments are devised for delicate root-scaling, and besides being universal in their reach on roots, they are also capable of entering and scaling at and around the bifurcations of molar roots, both above and below. The other numbers in the set of twenty-four instruments are compiled from other pyorrhea sets, with more or less modification. The aluminum-knob finger-rest No. 21 is an improvement on the use of any perishable material for the purpose of increasing firmness of grasp, and has the advantage of allowing sterilization by boiling. Nos. 22 and 23 are burs especially devised for the convenient removal of carious bone in sockets and at their borders. No. 24 of the set is a sharpening disk, to be used in the dental engine for quickly and accurately edging any instrument in the set.

Three tooth-brushes were also shown, specially devised to facilitate not only the cleansing of teeth, but the massage of gums. The wide-head brush carries a very small head on a very long neck, with ample space between the transverse rows of bristles, terminating in a long tuft. This brush is universal in its access to dental arches, both above and below, brushing from gums to teeth, both lingually and buccally, or labially. Where buccal space is scant at upper molars and distally of the farthest one, this brush is replaced with advantage by a still narrower one, which was also exhibited. The third brush in the set is a double-ender, one head being like a small hoe, and the other head like a

small, flat paint-brush, to cleanse under bridges and at crowns forming the abutments thereof, and to reach properly the necks of natural teeth next to gaps, no matter whether those teeth tilt over the gaps or not; also for use lingually of lower incisors and distally of rearmost molars.

Tooth-powders were also demonstrated, and mouth-washes with proper medicinal properties and polishing power, not commercial toilet articles. Powder No. 2 does active oxidizing without danger of irritation, and possesses mild alkaline germicidal properties. It is capable of polishing the enamel without scratching the cementum; it is classed as a preventive powder for general purposes. Powders Nos. 3 and 4 possess medicinal properties necessary in the adjunct treatment of pyorrhea, the only difference between those two numbers being that No. 4 has a perceptible grit to meet conditions which require it. This latter is valuable in office prophylactic work, besides home treatment in Riggs' disease. Mouth-wash No. 5 is a preventive preparation, which is at the same time capable of coping with congestion of the mucosa. It owes its efficacy to the combination of zinc iodid and zinc chlorid with other favorable drugs. It is also prescribed as a daily mouth-wash with preventive properties.

The clinician also exhibited flat dental flosses charged with antiseptic polishing powders supplying the different grits necessitated by the various conditions to be cared for, including the cleansing underneath bridges.

Dr. T. Sydney Smith, Palo Alto, Cal. "Pericemental Diseases."

This clinic is an effort to show that by early diagnosis, prevention, and cure of pericemental diseases—so-called pyorrhea alveolaris—we may not only keep the gums strictly normal, but also keep all the teeth in excellent condition to extreme old age. This brings about a new and wonderful era in dentistry, for it is the highest standard we can ever reach. The clinician wishes to contrast this statement with the teaching of the past age as voiced by many of our leading writers, viz, that the loss of these dental structures is a physiological event to be expected. Today we know that nature does not remove the gingival and septal tissues which she placed for essential purposes, but that their destruction is due to pathological actions, and always preventable simply by keeping the teeth highly polished and clean under the free margins of the gums.

The clinician also wishes to show that even though deep pockets are present and the teeth have become very loose, the gum tissues can be reattached to vital teeth by first intention—the blood-clot method—just as rapidly as a clean cut will heal in some other part of the same body, and the bone will also be reconstructed at the point where the soft tissues have been reattached. This rapid healing by first intention can only be secured by perfect surgery and nature's forces; we must therefore emphasize the value of the blood, which should not be washed out of the wound during any stage of the operation. We require it first for cleansing, second for sterilizing, and third for its reconstructive properties.

This blood is cleansing because of the tendency for liberated blood to coagulate, thus incorporating the loosened particles of deposit in the fibrin. In this

way the instruments bring them to the surface much more perfectly than would be possible by washing, since the tissues act like a sponge to hold them. Blood is sterilizing because the presence of micro-organisms in the pockets for considerable time has fortified the blood with anti-bodies to hold these germs in check. The specificity of these anti-bodies is beyond all human imitation, and these do not interfere with the reconstructive properties of the blood, as they are normal to it; they quickly sterilize the wound when we turn the balance of power on their side by perfect surgery. Lastly, the blood is essential to form the union between the freshened gum tissue and the cementum.

This method of healing has proved that the denuded cementum does not die while the pulp and dentin are vital. Microscopic anatomy has revealed the possible path for nutrition to pass from the dentin, and the easy passage of staining solutions from the pulp chamber to the pericementum has strengthened this theory, but the blood-clot method of reattachment has settled the question by showing that only granulation and close contact can be secured around a pulpless tooth, while the tissues readily unite with a vital one. This difference lies in the cementum, and shows life in the one case and death in the other.

This method of healing has determined another vital question. The fact that all absorption and destruction of bone immediately ceases when the reattachment of the soft tissues is secured indicates that the local seat was not in the bone, but its reconstruction proves beyond any doubt that the seat of the disease is in the pericementum and not in the alveolar process. We must therefore change our terminology. Pyorrhea is never an alveolar disease, but rather, in all its stages, a pericementitis.

CAST INLAYS.

Dr. Joseph Head, Philadelphia, Pa. "Compound Approximal Contour Gold Inlay, with a Gold Matrix, Moss Fibre Gold, and 22-Karat Solder."

The method demonstrated by the clinician is as follows: An accurate impression is made of the cavity with pure gold plate, 1/300 of an inch in thickness. A mass of moss fibre or any sponge gold is then molded in the fingers until it has the form of a wedge that will approximately fill the cavity when condensed. This wedge is pushed into the gold form while it is resting in the tooth cavity, great care being taken to burnish the moss fibre gold toward the wall of the adjacent tooth, so as to make a dense plate of gold that will serve as an approximal contact point. The filling being thus formed, more gold being added to obtain the desired contour, the gold matrix with the molded moss fibre gold is removed from the cavity and is filled with 22-karat solder, great care being taken that no solder flows on the outside of the contact point. When this is finished, the filling can be trimmed and polished in the usual way.

Dr. L. L. Zarbaugh, Toledo, Ohio. "Removing Impressions, Attaching and Chilling Sprue Wire in the Mouth."

The sprue wire is attached to the end of a nozzle on a water-syringe by means of a set-screw. The wire is heated and inserted in the wax, and a jet of cold water chills and firmly attaches the wax

to the wire. The wax model is then removed and invested.

Dr. H. H. Streett, Baltimore, Md. "Facing Inlays with Silicate Cement."

The cavity is prepared in the same manner as for a gold inlay, and the wax model is made; then the labial surface of the wax is carved away, and the model invested and cast. The gold is cemented into place, and the labial surface filled with any silicate cement. It is best to make undercuts in the gold before using the silicate cement.

By using this method we have all the advantages of a gold inlay without any gold showing.

Dr. C. O. Simpson, St. Louis, Mo. "Details in Inlay and Treatment Work."

The clinician demonstrated the following methods of practice: A staple of gold is incorporated in mesio-disto-occlusal wax inlay models to prevent their distortion. Hollow inlays are made by investing the external surface and the margins of the wax models, with the cavity surface exposed, so that the interior may be removed as desired without danger of distortion or injury to the margins. The desired contour on the approximal surface of inlay models is built up by additional wax before investing.

The clinician also showed some technique cases which illustrated the accuracy of fit to be obtained with Welden's Casting Porcelain. The clinician also demonstrated the ease with which cotton dressings may be carried to place in root-canals by the use of Dr. Funk's Apex-treating Broach. This broach has a small notch in the end to carry the dressing forward, but offers no resistance on its removal.

Dr. H. Herbert Johnson, Macon, Ga. "Other Methods of Making Gold Inlays, and Ideas in Crown Work."

The clinician demonstrated that in many cases the making of inlays by the Alexander Plastic Gold method is simplified by using a matrix in the cavity of No. 60 gold foil, or No. 20 rolled gold. The use of plastic gold was also shown in mounting crowns, backing teeth, etc. The clinician also showed how fillings of a high karat can be made for exposed surfaces by burnishing moss fibre or Corona gold into a matrix of No. 60 gold foil in the cavity, and can afterward be further solidified with a limited amount of 22-karat solder flowed into its surface.

Cases, represented by models, of broken lower jaws set with an original burnished gold splint to be cemented on the teeth, were also shown and explained. The use of Price's artificial stone was shown in the making of Alexander's hood abutments. This method was recommended because of the hardness of the stone, which renders it possible to do burnishing on its surface. This artificial stone will withstand a high heat, and annealing and soldering can be done directly on a model made of this material.

Dr. W. C. Gowan, Peterboro, Ont., Can. "New Cavity Forms for Gold Inlays, Shown by Preparations upon Extracted Teeth. Impressions, Models, Wax Patterns, and Castings."

The clinician demonstrated a departure from hitherto established cavity forms, which is rendered possible by Price's artificial stone and a new technique.

A cast inlay of complex form differs

from a corresponding foil filling, in tensile strength, retention, manner of insertion, and form necessary for resisting stress.

Gold alloyed with 5 per cent. of platinum or coin silver, or reinforced with iridio-platinum wire and cast under high pressure is stronger in all ways than is a foil filling of like size and form.

Certain interior dimensions and a certain form of the cavity are necessary for the insertion of foil which are not necessary for the insertion of an inlay.

To withstand masticatory stress an approximo-occlusal foil filling requires a broad, flat gingival wall at right angles with the axis of the tooth, as a foundation, and a dovetailed step on the occlusal aspect as a brace. An inlay, on the other hand, being a single rigid piece, is supported by the whole transverse area covered by it. Its hoodlike hold in the occlusal portion of the cavity is much stronger than that of a foil filling, so that in order to resist occlusal stress, a relatively smaller gingival wall, and sometimes none at all, is needed.

When the dentin underlying a marginal ridge is not destroyed by caries, broad rectangular preparation of the proximal portion of the cavity only transfers a part of the stress-resisting area from the step to the gingival wall, without increasing this area at all. Such preparation for a gold inlay, while perhaps necessary for making a wax pattern in the mouth, is obviously unnecessary for the purpose of retention or resistance against occlusal stress. It is, moreover, a cruelty when practiced in vital teeth, and a waste of tissue in any tooth. Thin edges of a gold inlay can be extended to any desired distance beyond the necessarily deep parts of a cavity; therefore the extension of the cavity outlines to immune areas does not require a like extension of deep parts designed for retention or resistance, as is the case with foil fillings.

By use of an impression and stone model, the complex cavity preparation for gold inlays can and should be made simpler and less wasteful than that for any other filling.

A thickness of gold sufficient to withstand the impact of opposing teeth without changing form, and a depth and distribution of parts effectual for resistance and retention when cemented, are always necessary; but no advantage is gained by adding to the mass of gold in excess of these requirements—the remainder of the cavity space, if any, would be better if filled with cement.

With our present facilities, cast inlays do not exactly fit cavities; they fit approximately. The joints are closed by burnishing. Speaking from experience, the greater the mass of gold in a cast inlay, the greater will be the errors in fit due to small though unavoidable inaccuracies such as arise from expansion or contraction in the wax, investment, or gold. Besides, the massive casting is more stubborn to manipulate in case of a small error in fit than is a thinner one.

Ordinary approximo-occlusal preparation. After excavating the débris to ascertain the extent of caries, the cavity is filled with a temporary cement. With a safety disk moistened with water the approximal surface, cement and enamel together, is cut flat, until a satisfactory cavity outline is established by the margins of the facet so prepared. It is not necessary that this facet be exactly flat, but it will be found that a flat prepara-

tion of either approximal surface of a molar or bicuspid will terminate in an outline closely measuring up to the ideal extension for prevention. The plane of this facet may be inclined slightly to the long axis of the tooth occlusally, to allow of withdrawal of the impression, or to terminate the facet gingivally without a step.

The occlusal step is prepared with a square-edged wheel, so as to terminate in a pit or groove to be deepened for the reception of a hook on the inlay. The margins upon the occlusal surface are beveled with stone points.

With a tapered fissure bur a groove is cut parallel to the long axis in the cement, as deep axially as the tooth is decayed, and reaching from the step to the dentin at the gingival termination of the carious area. This groove may vary in form or depth axially, according to the space for retention or resistance required in each case, but it always marks with certainty the gingival termination of the cavity, beyond which only the beveled enamel extends.

If the impression of the gingival outline should be mutilated in withdrawal, the end of this groove marks the place so well that no error need be made in building the wax or finishing the gold. The rib upon the casting produced by this groove serves to strengthen the casting, to guide it to place in setting, and to afford the cement a firm grip.

For mesio-occluso-distal cavities, the preparation is very simple. The mesial and distal portions are united by a square groove with beveled margins.

Chisels are not used in this method of preparing cavities. Before setting the inlay, the temporary cement filling and all carious tissue are removed.

Advantages.

The advantages of this new method of preparation are:

(1) Conservation of tooth tissue and consequent economy of time and labor. Conservation of the strength of the cavity walls and avoidance of painful cutting and needless removal of tissue in the region of the marginal ridge.

(2) An abrasive disk moistened with an excess of water cuts sensitive tissue with less pain than other instruments cause. Enamel cut with wet abrasive is in better condition to resist an attack of any kind than if cut with steel instruments.

(3) The impression and stone model technique, for which this form of preparation is intended, lessens the work done in the mouth, to the comfort of patient and operator.

(4) The form of the casting determined by this mode of preparation, especially of a mesio-occluso-distal cavity, makes the control of shrinkage in the solidification of the gold upon the stone model effectual, so that the inside dimensions of the casting are maintained, resulting in a more accurate fit.

(5) The relatively thin inlay, with consequently larger quantity of cement or tissue between the gold and the pulp, better protects the pulp against thermal irritation. The greater overlap of the joints protects the cement in case of inaccuracy of fit, and by their thinness the margins of the casting yield to the burnisher, allowing of perfect closure of the joints. An inlay that does not touch the interior surface of the cavity at all points is not so difficult of management

in case of misfit, as a massive casting always is when designed to fill the whole interior of a complex cavity.

(6) The gold being outside the tooth tissue rather than inside—*i.e.* the tough material inclosing the brittle—the latter is better protected against stress and abrasion. This permits the conservation of walls too thin or weak to be allowed to remain in any other form of cavity preparation or design of inlay.

(7) The principles, if not the details, of the preparation described are applicable to any complex cavity where a gold inlay is indicated, no matter whether in a molar, bicuspid, or incisor.

ORAL SURGERY.

Dr. Don M. Graham, Detroit, Mich. "Dental Radiography. Treatment of Fractures by Wire Anchorages and Fracture Bands."

This clinic consisted of radiographs showing various dental lesions, and illustrating the method of treating fractures of the jaw by means of wire anchorages and fracture bands.

Fig. 1.

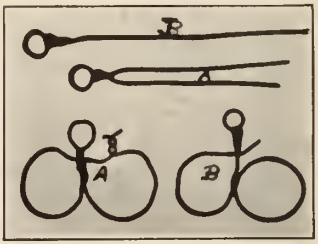
Fracture bands in position.

The wire anchorage and immobilization of the mandible is the method most frequently used. Fracture bands can be made to do good service also, but the wire anchorage would appear to give a wider range of usefulness and does not

Fig. 2.

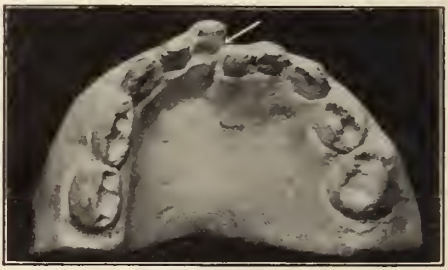
Wire anchorages ready for approximation.

Fig. 3.



Manipulation of wires for anchorages.

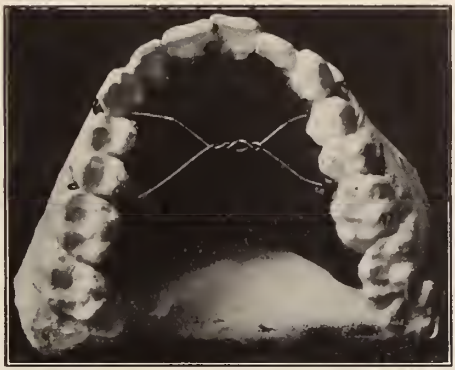
Fig. 4.



Model of lower jaw of a child, three years old, who suffered a green-stick fracture as shown.

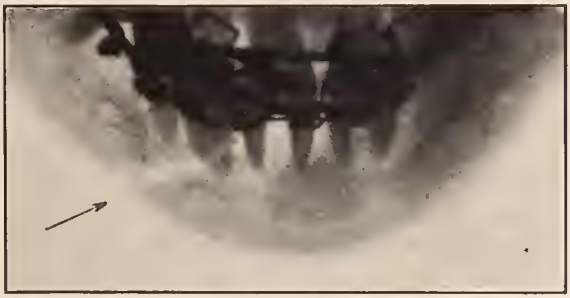
require the same close attention for safe retention, as do the fracture bands. Wires can be adjusted for anchorages about the teeth with almost absolute assurance that they will remain where placed. Copper or its alloy is the best material, and a 22-gage annealed copper wire will be found of sufficient strength for most cases. A German copper alloy of from 24 to 26-gage, as used by orthodontists, is employed by the clinician.

Fig. 5.



Method of using valcanite plate with retractive wires in fracture of malar process of maxilla.

Fig. 6.



Fractured mandible fixed to upper jaw by means of wire anchorages.

There appears to be no universally satisfactory method of fixation, but binding the jaws together seems to promise the best results. The comparative comfort and the results obtained are sufficient justification for such a procedure, and it is very seldom that objections are made to this method by the patient. The difficulty of obtaining nourishment has been greatly over-estimated, and the average patient, after such a fixation,

can go about his usual duties with comparative comfort. Patients should return at frequent intervals for inspection and adjustment of the apparatus. The wires will sometimes demand tightening, and the prevention of oral sepsis will necessitate careful oversight of the case until treatment is concluded.

Fig. 7.

Pathological fracture of lower jaw, which was broken when a tumor and a displaced molar were surgically removed.

Dr. John B. West, Elmira, N. Y "Hyperemia in Dentistry."

The clinician demonstrated the technique of the application of Dr. August Bier's method of producing obstructive hyperemia to dentistry.

The oldest and most favored means of producing obstructive hyperemia is the elastic bandage. Soft rubber is generally used, but for dental purposes garter elastic is preferable. The elastic should be about one inch wide and about eighteen or more inches in length, with a hook at one end and a number of eyes at the other.

The bandage is placed around the neck for the purpose of producing passive hyperemia of the superficial veins of the head. By passive hyperemia we mean a condition in which a part of the body has its vascular net more full on account of a diminished venous outflow.

The bandage is placed about the neck below the larnyx. It should feel somewhat like a tightly fitting collar, but only the superficial veins should be partially obstructed, and there must never be an increase of pain. Its action may be intensified by placing upon the jugular vein a pledget of soft cloth. Soon after the bandage is adjusted, the focus of acute inflammation will show an increase in the cardinal symptoms,

viz, marked redness, heat, and swelling, but a slow definite diminution of pain. If the bandage is placed about the neck for combating acute inflammation, it should remain in place from twenty to twenty-two hours, then be removed to allow the slight edemic condition to pass away. For chronic affections a shorter time will suffice—from two to four hours per day is generally sufficient.

The suction cups used for producing passive hyperemia are made of glass. The larger cups are intended for use on the outside of the jaw, while the smaller ones are for use on the gums. By means of a short piece of stout rubber tubing the suction cups are connected with the saliva ejector, and by regulation of water-pressure, suction of any desired degree is readily obtained. The suction for the ordinary cases of pericemental trouble is applied but once a day for about three-quarters of an hour, five minutes at a time, with three minutes' intermission, repeating the suction five to six times at the same sitting.

In certain stages of pyorrhea, congested hyperemia is of marked benefit. A special suction cup has to be constructed for each individual case. For the lower anterior teeth, the clinician uses an Angle impression tray from which the handle and heels have been cut off and a hole drilled in the center of the tray, to which brass tubing is soldered. The tray is filled with modeling compound, and an impression of the lower anterior teeth is taken. After the tray has been removed from the mouth, the modeling compound is cut away from the inner surface of the cup, leaving a thick continuous roll of compound covering the rim of the tray. By means of the rubber tubing, the tray is connected to the saliva ejector. The suction must be of mild degree, and is applied but once per day.

Bier's method of producing hyperemia is indicated in the treatment of all painful disturbances of the periosteum of the teeth and jaws. Some of the advantages of hyperemia treatment over the therapeutic procedures are suppression of infection and avoidance of suppuration, diminution of pain, and culmination of pathologic processes. Large incisions into abscess cavities may be entirely dispensed with, simple punctures, which naturally heal quicker, leaving very small or no scars, are usually sufficient for drainage with the suction cup. In the very early stages an artificially increased inflammation may successfully abort an incipient infection, and in already existing suppuration the processes of demarcation and final resolution are materially hastened.

Dr. H. L. Oliver, Dayton, O. "Restoration of Lower Mandible."

The cause for removing a section of the mandible in the case presented by the clinician was sarcoma originating in the region of the second bicuspid. The entire portion of the lower mandible was removed from the canine posterior to the glenoid fossa, including the coronoid process. No matrix was left.

The technique employed in the restoration of the mandible was as follows: In the remaining portion of the mandible eight teeth were left. Shell crowns were made to fit the two centrals, the left lateral, and the second molar, the first molar having been extracted. After the crowns had been fitted, an impression of the lower mandible was taken. The mandible should be drawn

to the left in order to get the muscles at their highest point. An impression of the upper arch was taken, and models were made of both jaws. The case was articulated with the crowns in position. Before pouring the model, a thin film of wax may be spread on the inside of the crowns. After the model is made the crowns may be easily removed by warming. The three anterior crowns were soldered together on the incisal edge in order to insure strength. A 14-gage wire of clasp metal is used. The angle-bar is then adjusted, and soldered at the cervical portion of the crowns. The latter can now be placed on the model in its original position. In order to obliterate the undercut, arising from the wire being round, a little plaster is spread along the sides of the bar before packing, otherwise the rubber would so engage the wire as to make separation after vulcanizing difficult. A clasp standardized, adjustable for tension and made to engage exactly a 14-gage wire of clasp metal, is used.

A lingual bar is used on the lower arch, with lugs fastened for the attachment of rubber where a portion of bone has been removed. Facial expression is restored by building up with rubber and articulating to the upper arch. The case is finished in the usual way. If occlusion, etc., is satisfactory, the abutments are tapped in position on the respective teeth, and the whole appliance is cemented in position at once.

CROWN AND BRIDGE WORK.

Dr. F. E. Buck, Jacksonville, Fla. "Soldering in Bridge Work."

The object of this clinic was to show the advantage of using solder in long strips and being able to change the position of the work instantly without being obliged to lower the temperature.

The solder flows by gravity to the spots where it is wanted. Less solder is used, and bubbles are entirely eliminated.

The solder in this work is made up into strips, eight inches in length, and one-fourth of an inch in breadth. The invested bridge is held in an adjustable soldering tray which can be moved instantly to any desired position.

Dr. R. F. Rowdybush, Decatur, Ill. "(I) The Injurious Effects of Poorly Constructed Crowns and Bridges. (II) Proper Construction for the Conservation of Hygienic Conditions of the Mouth."

I. The clinician showed poorly constructed pieces of crowns and bridge work and their injurious effects upon the surrounding tissues, also the systemic effect produced by wearing an unsanitary crown or bridge.

II. Sanitary bridges were shown.

Dr. P. B. Laskey, Marblehead, Mass. (I) "Refinement of Impression. (II) Repairing Inferior Bridges in the Mouth. (III) Compound Hypodermic Syringe. (IV) Stiffening Logan Crown Posts."

I. The clinician's method consists in eliminating all superfluous material. This is done through the form of the cup employed.

II. A tooth is fitted to take the place of the broken artificial one, and is placed in position; the pins should extend well through the backing, which has been countersunk. With a piece of firm metal charged with compound plaster or other impression material, an impression of

the labial surface is taken and allowed to harden in place. With a pair of strong pliers the ends of the pins are riveted down to the backing.

III. The instrument demonstrated is controlled by a lever which increases the power fourfold. The labor is divided, one hand controlling the needle and the tissue, the other applying the power.

IV. Strong, short-beak pliers were shown adapted for compressing the post.

Dr. J. L. Kelly, Chicago, Ill. "Removable Bridge Work."

Dr. Kelly demonstrated removable bridge work in which the principle of retention is a dovetail obtained by converging or diverging the attachments toward or from each other, or placing them in such relation to a tuberosity or other projection of the mouth that a dovetail or undercut is produced.

The attachment consists of three parts, viz, holding post, adjusting tube, and bridge tube. The holding post is made of round iridio-platinum wire, generally 14 gage, and one-eighth of an inch long. The adjusting tube and bridge tube are made of iridio-platinum in steel dies. The adjusting tube telescopes the holding post, and is telescoped in turn by the bridge tube.

After the attachments are made, the holding post is soldered to the cope, which is constructed as for a Richmond crown; then the adjusting tube is cemented to the holding post to center the bridge tube, which is made to telescope it. The bridge tubes are connected by a bar, completing the framework for the bridge, the remainder of which may be constructed as in the making of a plate.

When this denture is completed, the adjusting tubes which have been cemented on the holding posts are removed, so as to give play between the bridge tube and the holding post. This play is necessary to put the bridge in harmony with the flexibility of the tissue, thus preventing any strain on the roots.

If the play becomes so great as to loosen the bridge in time, a very thin adjusting tube may be cemented on one or as many of the holding posts as is necessary, until the desired retention is obtained. This makes it possible for the dentist to control the retention at will, without weakening or changing the attachment.

Dr. D. C. Clark, Blacksville, W. Va. "Restoration of Broken-down Roots for the Insertion of Porcelain Crowns."

The clinician demonstrated two methods of restoration, as follows:

(1) If the operator desires to place a porcelain crown on the root or roots of any tooth that is broken down on one side below the free margin of the gum, a small groove is drilled around and in the end of the root at the portion where it is broken down. A slot is drilled into the canal and around for a short distance on the inside. The canal is filled with amalgam, and the crown is placed in position while the amalgam is yet soft, to secure a perfect joint between the crown and the amalgam. The crown is then removed and placed back in position with cement. This method causes much less pain than the placing of a gold band in cases where the gum adheres closely to the root.

(2) The broken-down side is restored by placing around the end of the root a gold band wide enough at the broken side to extend above and fill out

the broken place. The band is to be very narrow for the balance of the distance around the root, so that it covers the joint between the root and the crown, and also strengthens the union.

If the band fits the end of the root, and also the tooth, the broken-down part will be filled with cement when the crown is in position. This cement will not dissolve any more than if employed according to the ordinary method of setting a crown.

Dr. Edward C. Hoffman, Plainfield, Ill. "Bandless Crowns."

A method of substituting metal or porcelain for enamel on teeth that have been worn down by mechanical abrasion was demonstrated by the clinician.

First the tooth is devitalized, the root-canals are treated and filled in the usual manner, and about one-eighth of an inch of the tooth is cut off; next an opening is cut in the center of the crown of the tooth about one-eighth of an inch in depth, and from one-eighth to one-fourth of an inch square, according to the size of the tooth. This opening is filled with inlay wax. The patient is requested to bite, and the cusps are carved in wax. The wax model is removed and cast in any metal desired, but, if porcelain is used, the space should not be less than three-sixteenths of an inch. The inlay is cemented to place, and the margins are finished in inlay wax.

Dr. J. G. Reid, Marion, N. C. "Suggestions for Crown and Bridge Work and Operative Dentistry."

This clinic showed a method of making a post for a cast crown, casting the post and crown together. A little piece of ordinary iron wire is cut and on it sufficient casting wax is built up to fill the canal. The wire is placed in position, allowing it to extend far enough in the root-canal to hold the facing when placed in position; then the crown is waxed up and carved ready for investing. The sprue is attached to the waxed post and the crown is invested. When the wax melts out, the little iron wire drops out, and when the cast is made, the post and crown are in one piece.

The clinician also demonstrated his method of casting into diatoric teeth. He also demonstrated a method of repairing broken facings in bridge work as follows: The old pins are ground off and the backing is slit up to the pins. The backing is ground off and a facing selected and set in position. A piece of 36-gage pure gold is then burnished over the back of the facing to extend over the tip, and the pins of the backing are pushed through the gold. The facing is held in position with sticky-wax, removed with the impression, invested, and soldered.

Dr. Reid also showed two cavities, one prepared and one filled, in the lingual surfaces of lateral and central incisors, the feature of the filling being that it was started with cement.

Dr. J. W. O'Bryon, Lawrence, Kans. "A Bandless Crown Which Reinforces the Root."

The crown described by the clinician is especially indicated in cases where the root is subject to fracture or splitting, as in lateral incisors, but it is applicable to any of the six anterior upper teeth. The root is prepared labially as for any bandless crown, being ground just below the free margin of the gum, to make

sure that the joint between the root and crown is hidden by the gum.

Lingually, however, the root is ground only to within one millimeter of the gum line. A lingual step is then made by cutting away with a small knife-edged stone the lingual side of the root to a depth of about one millimeter, this step to extend toward the root just below the free margin of the gum. The root can be more perfectly squared by preparing it, following the stone, with a sharp square-end fissure bur. The root-canal is then enlarged until a No. 4 round bur can easily be passed into it. A round 16-gage clasp-metal post is to be adapted to the canal with the end projecting sufficiently to reach the bottom of the hole in the base of a detachable-post crown —such as the Davis or S. S. White. The next step consists in grinding the crown labially to fit the labial surface of the root—which usually requires very little grinding. The lingual two-thirds of the base of the crown should, however, be ground considerably more in order to produce a V-shaped space which will insure sufficient bulk to impart adequate strength to the cast base with its lingual projection.

Having the crown thus prepared and fitted to the labial portion of the root, and the post adjusted to the opening in the base of the crown and reaching its bottom, a plate of pure gold of 34-gage is adapted to the lingual two-thirds of the base of the crown and perforated at the opening into the crown so as to receive the crown end of the post. The object of this plate of gold is to reinforce the thin portion of the wax pattern for the cast base and to prevent its becoming loosened from the post during manipulation. This plate of gold having been adapted, the crown end of the post is inserted through it into its place in the crown, and then carefully removed together with this plate, and the two are tacked with a bit of 18-karat solder. The little plate with the post attached is then placed in position on the base of the crown, and a small portion of Taggart inlay wax is softened and adapted to the lingual two-thirds of the base of the crown, the wax being shaped to approximate the form of the cast base to be, and without very much excess of material.

The crown and the adapted wax are then warmed together and placed in position on the root and pressed home, and with a warm, flat-sided burnisher the wax is pressed lingually closely to the root. It is then carefully carved to conform with the perimeter of the root. The crown is then removed, leaving the post and wax base pattern *in situ.* The wax may be further carved if necessary, and then removed and cast to the post in 22-karat gold. The remainder of the operation is the same as for any cast-base crown.

The finished crown has a 22-karat gold lingual extension, engaging with the step in the prepared root, which affords more strength than the ordinary band, absolutely prevents rotation of the crown, and being flush with the outline of the root, causes no irritation of the lingual margin of the gum.

Dr. S. D. Ruggles, Portsmouth, Ohio. "Crown-Setting Pliers."

The purpose of this clinic was to demonstrate a new instrument for setting crowns and regulating bands.

When a crown is to be set, the mouth is usually packed with cotton rolls, bib-

ulous paper or napkins, and when into this already obscured field the crown is introduced, being held between two fingers, it is seldom that a clear view is at all possible.

The nervous strain at this point of the operation often results in a mishap, or in

placing the crown in an incorrect position, resulting in failure.

The pliers illustrated have been used for two consecutive years, and have proved beyond a doubt their adaptability to holding and accurately placing any crown in its proper position on a bicuspid or molar without at the same time obstructing the full view of the root. A four-tooth bridge can be manipulated with the same ease as a regulating band by means of these pliers.

Dr. C. B. Reed, Topeka, Kans. "Steele's Facings in Plate Work."

Dr. Reed demonstrated the utility of Steele's facings as applied to "short-bite" dentures, the special feature being that of soldering gold plate extensions to the backings with dovetail terminals to engage in the vulcanite, resulting in the greatest possible strength, and at the same time reducing the bulk and thickness to an absolute minimum. Such a denture is indicated in those exceedingly troublesome cases where the mechanical stress is such as to force the teeth continually from the plate when attached in the conventional manner.

Dr. Reed also exhibited various partial plates, both of gold and rubber, showing the peculiar adaptability of Steele's facings in cases of extreme absorption. These facings being replaceable render possible the substitution of longer teeth as resorption progresses.

Dr. C. E. Peters, Pittsburgh, Pa. "A Banded Porcelain Crown Combining All Necessary Requirements with a Time-saving Technique in Its Construction."

The preliminary preparation of the root demonstrated by the clinician is the same as for a Richmond crown. A gold ferrule is fitted to the root, and to this a floor of 36-gage pure gold is soldered, allowing the solder to attach only the lingual half of the circumference. A 14-gage tapered iridio-platinum or

platinized gold wire is then fitted to the root-canal, allowing it to project about three-sixteenths of an inch. The cap is then placed upon the root, and the pin forced through it to place. This is attached to the cap with sticky-wax, removed, and placed into a soft asbestos block, which holds the parts in their proper relation until soldered. The labial portion of the band is then cut away. Before being placed upon the root for final adaptation, the labial portion of the root end is trimmed beneath the gum sufficiently to hide the joint, using a large bur or small stone. The cap is then placed, and the labial portion burnished to the root. A detached-post crown of the proper size is ground to fit, using thin carbon paper to secure the joint. The crown is then cemented to the cap, removed, and ground flush with the side of the cap, polished, and cemented to the root. This method combines pleasing results and interchangeability with strength, simplicity, and economy of time.

Dr. J. E. Waterbury, Los Angeles, Cal. "A Quick and Accurate Seamless Gold Crown."

The clinician demonstrated a method of reshaping the ordinary, conventionalized cusp of the die-plate-made crown, by softening the gold in alcohol at white heat, replacing it on the tooth in the mouth, and allowing the patient to bite it into perfect occlusion. The points of the cusps are extended and shaped with special pliers in such a manner as to provide the best possible masticating surface for the finished crown. The pliers are also used to form the correct contact points with the adjoining teeth.

The clinician also showed a method of coaxing the solder which reinforces the cusp back to the center and away from the sides of a crown, by dropping a small bit of plate gold, fluxed on the lower side, into the invested crown and reheating. The solder will flow to this piece in the center and distribute itself evenly over the whole floor of the cusp.

Dr. W. A. Capon, Philadelphia, Pa. "Porcelain Bicuspid Jacket Crown."

The preparation of the crown or remainder of crown—more often the lat-

Fig. 1.

Fig. 2.

ter—is very similar to that for a gold cap, with the exception that the buccal surface must be ground to allow for the veneer, as shown in Fig. 1.

The circumference is measured with wire, and the band cut from platinum plate, gage 31, allowing for the lap-joint always used in this crown as in other porcelain jacket crowns. The joint is soldered with a small quantity of pure gold, then the edge is cut to conform to the gum margin, and the root is fitted as shown in Fig. 1. The joint of the platinum band is placed on the lingual side. If found to be a little large, the edge is compressed with bent-nose pliers; but in any case, the fitting must be corrected before adding porcelain. The band is then marked to be cut almost even with the tooth-crown, or at

least closely enough to be free of the opposing tooth.

The band is removed and platinum foil is burnished over the end of the root or the portion of the tooth to be crowned, and the band replaced. Porcelain body is then packed over the whole surface even with the edges of the band. A veneer is put into position, or the face may be carved, and the whole crown is drawn and placed in the furnace ready for fusing. After the first baking, it is placed on the root and the bite noted, and the crown is then finished by making cusps of porcelain and fusing a second time. When completed, the outward appearance of this crown is as represented in Fig. 2. The platinum foil is allowed to remain.

Dr. W. W. Flora, Colorado Springs, Colo. "Casting Gold Against Porcelain Without Fracturing the Porcelain."

Some metallurgists claim that the contraction of porcelain under heat renders it impossible to cast gold against it without cracking the porcelain, yet the clinician's demonstration proved conclusively that it may be done if just a few principles are observed.

If a large pin is embedded in the porcelain, as in a Logan crown, it is necessary to place the crown in the investment in such a position that the pin will be farther from the metal ring than the porcelain; the heat should be applied very slowly, but carried to almost incandescence. The sprue should be so placed that the molten metal will first come in contact with the investment, backing up on porcelain. If these simple rules are observed, no difficulty will be experienced in casting against porcelain successfully.

ORTHODONTIA.

Dr. E. S. Butler, New Rochelle, N. Y. "Orthodontia."

This clinic consisted in the demonstration of Angle's new appliances for moving the teeth bodily by gentle stimulation of bone-growth, and their adaptation and technique. Some of the advantages claimed for these appliances are the practical abolition of pain, more perfect control over the distribution of the force, elimination of all danger of displacement of the appliance, lesser frequency of appointments, and elimination of the necessity of prolonged retention.

Dr. C. G. Bell, Ashland, Ky. "Shortening and Rotating Teeth by Excising."

The tooth to be shortened is devitalized. A small portion is resected at the gingival portion of the tooth and a platinum post is used in the same way as if an artificial crown were to be used, bringing the incisal edge to the normal incisal line.

In rotating a tooth, the same procedure is used in regard to the post and devitalization, but no tooth is resected unless the tooth to be rotated is also elongated.

Dr. Sinclair Tousey, New York, N. Y. "Radiographic Measurement of the Permanent Teeth Before the Loss of the Deciduous Teeth, to Provide for Preliminary Regulation of the Arch, If Required."

Imperfect development of the teeth is not only a disfigurement, but renders proper mastication impossible and the proper action of the saliva unlikely. The immediate effects are starchy indigestion and irritation from unmasticated meat, with auto-intoxication from both.

In the young child, as Dr. Strang remarks—"The nasal passages are lined below, in front, and on both sides by the germs of the teeth," and imperfect development of the teeth and of the maxillary bones supporting them occasions maldevelopment in the bony walls of the nasal passages and the accessory pneumatic sinuses of the face; and the effect of underdevelopment may even extend to the cranial cavity and the brain.

Deviations of the septum and mouth-breathing unrelieved by the removal of adenoids and tonsils are among the results of maldevelopment of the teeth with a too narrow and too highly arched hard palate.

The object of the clinician's most recent work has been to determine beforehand the presence and position, and especially the size, of the permanent teeth before the loss of the deciduous ones. The latter may be quickly and easily trained to a curve of the proper radius, and will then guide the permanent teeth into proper position.

Actual measurements of the deciduous teeth bear no fixed ratio to actual measurements of the permanent teeth. In a series of seven cases shown in table *A*, the ratio varied thirty per cent. In the same cases untreated, the curve of the deciduous arch, whether suitable for the permanent teeth or not, was reproduced in the permanent arch. X-ray measurements of the width of the unerupted permanent upper and lower central incisors at the age of five or six years correspond within one-hundredth of an inch with the actual measurements of the same teeth five years later, after eruption (see table *B*).

The clinician's technique is as follows: The deciduous centrals are measured with a sharp-pointed caliper square with a screw adjustment, and graduated

Fig. 1.

Fig. 2.

Fig. 3.

in one-hundredths of an inch. A wax impression of the curve of the deciduous upper and lower arches is made. Radio-

(*A*)

PERMANENT CENTRAL INCISORS:

Measured radiographically before eruption, and actually, some years later, after eruption.

(In 100ths of an inch.)

NAME.	Tooth (central)	Radiograph (uneruptcd)	Actual (after eruption)
Matthew Sweeney .	Lt. up.	39	38½
Clara Tucksmith .	Rt. up.	36	36
" " .	Rt. low.	22	22
Cecelia Leonard .	Rt. up.	34 oblique	33
Gretchen Winter .	Rt. up.	29	29
Florence Fox . .	Rt. up.	35	34
Sissie Reilly . .	Lt. up.	36	36
Jeanette Stevens .	Lt. up.	32	32
" " .	Rt. low.	21½	22

(*B*)

DECIDUOUS AND PERMANENT CENTRAL INCISORS:

Actual width. (Permanent incisors measured some years later.)

(In 100ths of an inch.)

NAME.	Years of age—1st measurement	Years of age—2d measurement	Weight in lbs. at 2d measurement	Right upper central—*deciduous*	Right upper central—*permanent*	Ratio 1 to	Left lower central—*deciduous*	Left lower central—*permanent*	Ratio 1 to
			(lb.)						
Matthew Sweeney .	6	8	. .	25	38	1.52	15	24½	1.63
Clara Tucksmith . .	5	10	85	24	36	1.50	15½	22	1.42
Cecelia Leonard .	7	9	. .	21	33	1.30	. .	21	. .
Gretchen Winter . .	5	10	73	25	29	1.16	14	19	1.36
Margaret Frutchy .	5	10	72	25½	33	1.25	16½	21	1.28
Florence Fox . . .	5	10	63	25	34	1.36	14	21	1.50
Sissie Reilly	5	10	60	23	36	1.57	11	23	2.09
Jeanette Stevens . .	6	8	. .	22½	31	1.38	. .	.	. .
Nora Ferguson . .	6	6	. .	. .	35	. .	. .	. .	. .

Fig. 4.

Fig. 5.

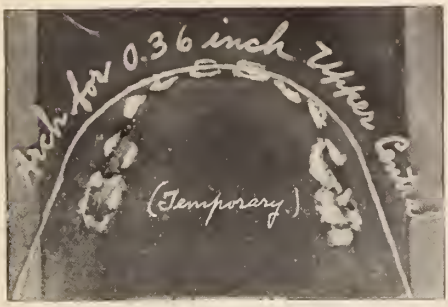


Fig. 6.

graphs or X-ray pictures (Figs. 1, 2, and 3) are made of the unerupted upper and lower central incisors, and the width of the images of these teeth is measured (see Fig. 4). A curve suitable for permanent teeth of this size is calculated by a modification of Hawley's and Bonwill's tables. The deciduous bite is photographed with the actual curve formed by the cutting edges of the incisors, the cusps of the canines, and the buccal cusps of the bicuspids and molars, and upon the same photograph is drawn the correct curve (Fig. 5) to accommodate permanent teeth of the size determined by the X ray. The orthodontist may regulate the deciduous teeth to this curve, and so guide the permanent teeth into proper position as they erupt. Fig. 6 shows the same case as Fig. 5, in which the deciduous curve was too small for permanent teeth of the size shown by the X ray. The case was untreated, and five years later the curve formed by the erupted permanent teeth was a contracted one of the same radius as that originally formed by the deciduous teeth.

The work shows the size that the permanent teeth will have, and the radius of the curve required to accommodate them.

Dr. Horace L. Howe, Boston, Mass. "(I.) An Appliance for Making Badly Inclined Teeth Perpendicular. (II.) An Appliance for Retaining Class II Cases. (III.) Band with Inclined Plane for Retention."

I. Fig. 1 illustrates the arch wire and appliance in position. In class II cases the lower incisors are usually badly inclined. To overcome this, T's are soldered to the arch wire so that the horizontal parts of the T's rest against

the upper part of the labial surface of the teeth with the arch wire away from the necks of the teeth. Ligatures are applied to the teeth and arch as usual,

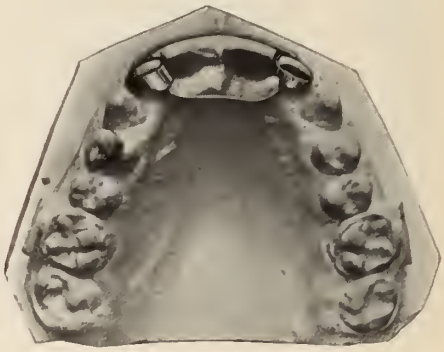
Fig. 1.

with the result that the crowns are forced lingually, and the roots of the teeth carried labially. If desirable to force the crowns considerably lingually, the nuts may be turned away from the tubes on

Fig. 3.

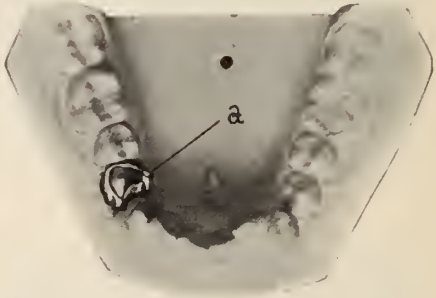
the anchor teeth. If rotation of a tooth is desired, the horizontal part of the T may be bent with pliers so as to bear harder on the part of the tooth to be turned. These T's are most effective, and are designed to take the place of the double arch in front, which the clinician used for the same purpose and brought out in 1904. (See *Dental Cosmos,*

Fig. 2.



December 1904.) The T's may also be used upon the upper arch. I find them very useful in aligning the upper laterals

Fig. 4.



that have been carried considerably forward. With the T, the tooth may be made more perpendicular, and the mesial corner may be forced inward, which is so often desirable. It is sometimes desirable to band the tooth to be moved, to prevent the ligature from slipping.

II. An appliance for retention in class II cases (Fig. 2) illustrates an inclined

plane adjusted to the laterals to receive the lower incisors. A retaining wire must be adjusted to the lower incisors to prevent any labial movement. Fig. 3 shows the labial aspect of the appliance in position. This appliance is a modification of the Ainsworth principle, which is so useful in retention.

III. Fig. 4 shows an inclined plane soldered to a band on the lower first bicuspid. This is designed to maintain normal occlusion in unilateral distal occlusion cases. A sharp incline, a, is built up to strike mesially to the palatal cusp of the upper first bicuspid.

Dr. T. P. Sullivan, Fall River, Mass. "Casts Showing Supernumerary and Supplemental Teeth and Peculiar Positions of the Same."

Dr. Sullivan exhibited thirteen models, five showing supplemental laterals and eight showing supernumerary teeth; in three of the latter cases there were two supernumerary teeth in each case.

Dr. M. F. Finley, Washington, D. C. "Orthodontia."

Dr. Finley demonstrated the use of the Jackson system in rotating centrals, bands being cemented to central teeth, using the double U or staple, which is removable; also the moving of a single tooth by means of finger springs. The clinician also showed again the case presented at the Denver meeting, in which there was absence of all the bicuspids, and in which there were no germs for the second and third molars, leaving the patient with a permanent denture of sixteen teeth and four deciduous molars.

Dr. C. W. B. Wheeler, New York, N. Y. "Technique of Making the Jackson Appliance of Precious Metals."

Dr. Wheeler's clinic consisted in showing how the Jackson appliance could be made of precious metals, thus forming a cleaner, stronger, and more springy appliance in the parts where the spring is most essential.

The clinician also demonstrated the ease and rapidity with which a repair can be made, or an extra wire added.

The metal recommended is pure gold containing a trifle of platinum, the same metal being used in making gold and platinum arches.

The technique follows closely that of making a Jackson appliance with base metal, with the exception that 22-karat solder is used, and the parts are tacked together by means of an orthodontic blowpipe on a green model. After this is done, the appliance can be removed, its body waxed up, then invested, and in a few minutes soldered, letting the solder flow into the parts that are essential to give strength.

These appliances can be made much lighter and also more compact than those of base metal, owing to the strength of the gold alloy.

Dr. Arthur Zentler, New York, N. Y. "Inherited Malalignment."

The clinician's object in exhibiting casts (Figs. 1, 2, 3, and 4) was to substantiate the belief that the etiological factors with which orthodontia is concerned are not postnatal only, but often prenatal. It would otherwise be difficult to explain the influences bringing about similar faulty alignment of teeth in children of the same parents.

Figs. 1 and 2 represent casts of the mouths of two sisters, one of seventeen years, the other twenty-five, both showing, on the left side of the mouth, one

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

upper front tooth, in one the lateral and in the other the canine inlocked by the lower teeth, interfering with proper occlusion.

Figs. 3 and 4 represent casts of the mouths of two sisters, one twenty-six years of age, the other sixteen, showing each the same faulty tooth alignment, producing pronounced malocclusion.

The family histories in both these and in several other cases under the clinician's observation point to similar malalignment of teeth in one or the other parent.

Dr. Arthur Zentler, New York, N. Y. "Improving Occlusion of Posterior Teeth Through Correcting One Malaligned Front Tooth."

The upper left lateral in the cast shown (Fig. 5) having been brought into proper alignment, the improved occlusion of the posterior teeth is seen in Fig. 6, showing the left side of the mouth, as well as in Fig. 7, showing the right side of the corrected case in contrast with Fig. 8, showing the same side before correction.

Fig. 9 shows the appliance *in situ* in a different case, similar to the one used in case Fig. 5, and its construction is plainly visible.

For the purpose of bringing the tooth into proper alignment, the free end of the retracting spring wire is bent out of the line of the dental arch to a point representing twice the distance between where the malaligned tooth stands and where it is desired to move it to. Then the retracting spring wire is sprung close to the dental arch and tied to the tooth by passing a wire ligature through a tube soldered vertically in the center of the labial side of the band cemented on the tooth to be aligned, and engaging the

retracting spring wire. This manner of ligating promotes a complete carrying

Fig. 5.

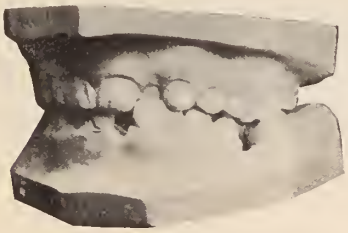


Fig. 6.

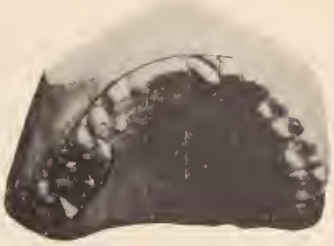
Fig. 7.

Fig. 8.

out into alignment of the entire tooth, avoiding a mere tipping of the crown.

When the malaligned tooth needs not only to be retracted, as in case Fig. 5, but

Fig. 9.



also rotated, as in case Fig. 9, the attachment is made lingually, and according to the direction in which the tooth must be rotated the tube is soldered nearer to the linguo-distal or linguo-mesial part of the band.

CROWN AND BRIDGE WORK—PORCELAIN WORK—CASTING.

Dr. J. C. Reed, Harrisburg, Pa. "Special Dentures made with the Aid of the Casting Process."

This clinic consisted in the demonstration of the clinician's method of retaining difficult lower dentures, also his method of making bridges with inlay abutments. The clinician also showed a large gold inlay with removable core, insuring ease of access in root-treatment.

Dr. Emerson R. Sausser, Philadelphia, Pa. "The Insertion of Two Porcelain Inlays."

The patient presented two cervical cavities, one in the upper left lateral incisor, the other in the upper left canine. These cavities had been prepared painlessly under novocain local anesthesia by the operator in his morning clinic. In preparing the cavities, the operator secured depth, shaping the walls almost

perpendicular with the floor and with no bevel on the margins. The matrix was filled with porcelain while it was still in position in the tooth, which procedure eliminates the necessity of reburnishing the matrix after the first bake. The clinician emphasized that there is little or no doubt in his mind that distortion of the matrix is due to the handling, and not to the baking.

Dr. C. P. Grosby, St. Louis, Mo. "Inlay Attachments and Root Preparation; Illustrating (*a*) Cavity Preparation for Inlay Abutments with Dowel Attachment. (*b*) Saving Badly Broken-down Roots."

(*a*) The clinician demonstrated the advantage of a bridge having inlay abutments with dowel attachments, by showing various models and a bridge mounted on an articulated form. The success of the inlay abutments depends largely upon the careful preparation of the cavities, consisting of a flat base from which the axial margins should be trimmed at right angles or very slightly diverging toward the periphery. Care should be taken in the preparation with the view of creating a self-cleansing area, and the attachments should be well supported by threaded iridio-platinum dowels, No. 14 gage.

Fig. 1 shows the preparation of the abutments.

Fig. 2 shows the occlusal surface of the inlay, with the bridge in position.

Fig. 3 shows the side view of an inlay bridge in position.

Fig. 4 shows the buccal view of an inlay bridge in position.

(*b*) Dr. Grosby also showed several badly broken-down roots, many of which are being daily sacrificed by extraction. He demonstrated that by using careful judgment, these roots may be saved and rendered useful for several years. The

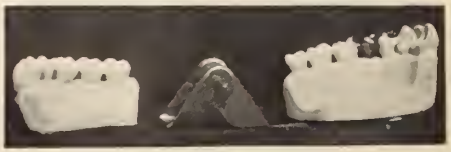
Fig. 1.

Preparation of abutments.

Fig. 2.

Occlusal surface of inlay bridge in position.

Fig. 3.



Lingual view of bridge in position.

Fig. 4.

Buccal view of bridge in position.

procedure adopted by him is as follows: After being properly treated, the tissues

are gently pressed back, and the carious portion is carefully excavated, shaping the cavity as nearly to a step formation as possible. An inlay cast in some metal and attached to a 16-gage iridio-platinum dowel, the post extending well into the canal when cemented to place, forms a strong abutment for either a crown or a bridge.

Dr. C. B. Brownell, Sandwich, Ill. "Cast Retaining Appliance Carrying Missing Teeth."

Cavities were prepared by the clinician with gem stones and cross-cut fissure burs, in the lingual surface of teeth involving the mesio-lingual and disto-lingual embrasures, extending the cavity across the incisal edge by removing the lingual plate of enamel. On the gingival margin the enamel is cut away to make a shoulder or base, while the enamel over the pulp is not disturbed. Retention is secured by slightly undercutting the central portion of the enamel over the pulp. The wax model is to be drawn toward the incisal edge. Inlays are then cast separately and replaced in the mouth. An impression is taken, and the appliance is invested and soldered in the usual way. Any style of tooth can be used for replacing the ones lost. When completed the appliance is set with cement as in the case of any inlay.

Dr. E. E. Cruzen, Baltimore, Md. "Exposing the Margins of Inlays Used as Abutments in Bridge Work."

The object of this clinic was to demonstrate a method of assembling bridge and inlay abutments in such a manner that the margins of the inlay are as free and accessible for cleansing as though they were individual fillings.

Proper cavity preparation for the inlay in regard to outline and walls is presupposed.

The technique consists in inserting a post of 14-gage iridio-platinum or clasp gold wire into the canal, and bending it at a right angle at a point corresponding to the natural contact point of the approximal surface. Inlay impression wax is shaped about the bend of the pin, and the pin is inserted in the canal, the wax pressed into the cavity, the occlusion obtained, and the wax carved to the form desired. The angle of the pin should protrude 1/16 of an inch or more through the wax on the approximal surface. The impression is removed by grasping the angle of the pin, or by a sprue wire, and a casting is obtained. The inlay is to be polished, but the pin projecting through is not to be disturbed. The inlays are then placed in the cavities, the bite is taken, and an impression obtained in plaster. This is done by using a cup that is smooth and free from scars, so it will come away easily from the plaster. After the plaster has hardened so that it will break with a clean and sharp fracture, it is removed in sections. The sections are brought together, and the inlays placed in position and tacked with a small bit of wax.

The model obtained from the impression is to be made of the same investing material as is used for soldering.

In this way a model is obtained with the inlays in position, and the projecting points. A piece of 24-karat gold plate of from 30 to 35 gage, such as is used for backings, is cut to the size of the approximal surface of the filling or tooth, and a hole punched through it corresponding to the size and position of the projecting pin, over which it is placed and tacked with a little sticky-wax, but

no wax is to be allowed to flow between the filling and the gold plate.

This little gold plate should be contoured as desired before it is waxed to place, as it is to represent the approximal surface of the bridge tooth, and should be spaced at the gingival margin as desired, so as to represent the interproximal space.

The dummy is then adjusted in any manner that judgment may dictate, whether it be a saddle, so-called self-cleansing space, or a compromise. In any case, the margins of the inlay abutments, when the piece is completed, will be as fully exposed for cleansing as though they were individual fillings.

The model is invested with the appliance waxed in place, care being taken to insure that the investing material fills the space between the inlay and the little plate of gold, in order to avoid any possibility of solder flowing on the face of the inlay and defeating the object.

Dr. Geo. S. Tignor, Atlanta, Ga. "Steele's Facings in Bridge Work; Illustrating Construction of a Bridge."

The clinician showed one upper four-tooth bridge with gold inlay abutments in the first bicuspid and in the second molar, with iridio-platinum pins in the root-canals; also one lower four-tooth bridge with iridio-platinum pins in the bicuspid root-canals, and a saddle under the end of the extension.

APPENDIX.

Organization of the N. D. A.

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PERMANENT MEMBERS WITHOUT DUES.

The following members are "permanent without payment of dues," under Standing Resolution No. 10, by virtue of having been in reputable practice for a period of fifty years:

Chase, Emma Eames, 3334 Washington ave., St. Louis, Mo.
Field, Geo. L., 4 Adams ave., W., Detroit, Mich.
Holmes, E. S., New Aldrich Bldg., Grand Rapids, Mich.
Lyman, A. E., Melbourne, Fla.
Palmer, Corydon, Warren, Ohio.
Rich, John B., New York, N. Y.
Trueman, Wm. H., Philadelphia, Pa.
Truman, Jas., 4505 Chester ave., Philadelphia, Pa.
Turner, V. E., Raleigh, N. C.

Surviving Charter Members of the Southern Dental Association.

The following surviving charter members of the Southern Dental Association are also "permanent members without dues":

Augspath, Louis, Little Rock, Ark.
Carpenter, L. D., Atlanta, Ga.
Cole, W. T., Newman, Ga.
Cooke, W. H., Denton, Texas.
Gorgas, F. J. S., 259 N. Eutaw st., Baltimore, Md.
Lowrance, H. A., Athens, Ga.
Marshall, E. B., Rome, Ga.
McDonald, R. H., Griffin, Ga.
Rambo, Samuel, Montgomery, Ala.

PAST PRESIDING OFFICERS.

I. PRIOR TO CONSOLIDATION.

Ex-Presidents American Dental Association.

1859. *W. W. Allport, Chicago, Ill.
First meeting, for organization.
1860. *W. H. Atkinson, Cleveland, Ohio.
1861. (No meeting.)
1862. *George Watt, Xenia, Ohio.
1863. *W. H. Allen, New York, N. Y.
1864. *J. H. McQuillen, Philadelphia, Pa.
1865. *C. W. Spalding, St. Louis, Mo.
1866. *C. P. Fitch, New York, N. Y.
1867. *A. Lawrence, Lowell, Mass.
1868. *Jonathan Taft, Cincinnati, Ohio.
1869. *Homer Judd, St. Louis, Mo.
Owing to a change in the constitution, officers elected at this and the sessions following served at the annual meeting subsequent to their election.
1870. *W. H. Morgan, Nashville, Tenn.
1871. *Geo. H. Cushing, Chicago, Ill.
1872. *P. G. C. Hunt, Indianapolis, Ind.
1873. *T. L. Buckingham, Philadelphia, Pa.
1874. *M. S. Dean, Chicago, Ill.
1875. *A. L. Northrop, New York, N. Y.
1876. *Geo. W. Keely, Oxford, Ohio.
1877. *F. H. Rehwinkel, Chillicothe, Ohio.
1878. *H. J. McKellops, St. Louis, Mo.
1879. *L. D. Shepard, Boston, Mass.
1880. *C. N. Peirce, Philadelphia, Pa.
1881. H. A. Smith, Cincinnati, Ohio.
1882. *W. H. Goddard, Louisville, Ky.
1883. E. T. Darby, Philadelphia, Pa.
1884. J. N. Crouse, Chicago, Ill.
1885. *W. C. Barrett, Buffalo, N. Y.
1886. *W. W. Allport, Chicago, Ill.
1887. *Frank Abbott, New York, N. Y.
1888. C. R. Butler, Cleveland, Ohio.
1889. M. W. Foster, Baltimore, Md.
1890. *A. W. Harlan, Chicago, Ill.
1891. W. W. Walker, New York, N. Y.
1892. J. D. Patterson, Kansas City, Mo.
1893. (Formal session only, owing to the holding of the World's Columbian Dental Congress; officers elected in 1892 holding over until 1894.)
1894. *J. Y. Crawford, Nashville, Tenn.
1895. *J. Y. Crawford, Nashville, Tenn.
1896. James Truman, Philadelphia, Pa.

Ex-Presidents Southern Dental Association.

1869. *W. T. Arrington, Memphis, Tenn.
First meeting for organization; Jas. S. Knapp being chairman *pro tem.*
1870. *W. T. Arrington, Memphis, Tenn.
1871. *Jas. S. Knapp, New Orleans, La.
1872. *F. Y. Clark, Savannah, Ga.
1873. *H. M. Grant, Abingdon, Va.
1874. *Robert Arthur, Baltimore, Md.
1875. *J. R. Walker, New Orleans, La.
1876. *W. T. Arrington, Memphis, Tenn.
1877. *W. G. Redmund, Louisville, Ky.
1878. S. J. Cobb, Nashville, Tenn.
1879. F. J. S. Gorgas, Baltimore, Md.
1880. *J. B. Patrick, Charleston, S. C.
1881. V. E. Turner, Raleigh, N. C.
1882. E. S. Chisholm, Atlanta, Ga.
1883. L. D. Carpenter, Atlanta, Ga.
1884. *H. J. McKellops, St. Louis, Mo.
1885. *A. O. Rawls, Lexington, Ky.
1886. *W. C. Wardlaw, Augusta, Ga.
1887. *W. W. H. Thackston, Farmville, Va.
1888. *B. H. Catching, Atlanta, Ga.
1889. *J. Y. Crawford, Nashville, Tenn.
1890. *John C. Storey, Dallas, Texas.
1891. G. F. S. Wright, Georgetown, S. C.
1892. Gordon White, Nashville, Tenn.
1893. B. Holly Smith, Baltimore, Md.
1894. (Same officers held over.)
1895. *H. E. Beach, Clarksville, Tenn.
1896. John S. Thompson, Atlanta, Ga.
1897. W. H. Richards, Knoxville, Tenn.

* Deceased.

II. SINCE CONSOLIDATION.

Ex-Presidents National Dental Association.

1897. *Thomas Fillebrown, Boston, Mass.
1898. Harvey J. Burkhart, Batavia, N. Y.
1899. B. Holly Smith, Baltimore, Md.
1900. G. V. Black, Chicago, Ill.
1901. J. A. Libbey, Pittsburgh, Pa.
1902. L. G. Noel, Nashville, Tenn.
1903. *C. C. Chittenden, Milwaukee, Wis.
1904. Waldo E. Boardman, Boston, Mass.
1905. M. F. Finley, Washington, D. C.
1906. A. H. Peck, Chicago, Ill.
1907. William Carr, New York, N. Y.
1908. V. E. Turner, Raleigh, N. C.
1909. Burton Lee Thorpe, St. Louis, Mo.
1910. Edward S. Gaylord, New Haven, Conn.
1911. A. R. Melendy, Knoxville, Tenn.

* Deceased.

[Revision as Adopted at Washington, September 1912.]

Constitution and By-laws of the National Dental Association.

CONSTITUTION.

Article I—*Name.*

The name of this organization shall be The National Dental Association.

Article II—*Object.*

The object of this association shall be to promote the art and science of dentistry. To achieve this the association shall endeavor to unite the dental profession of the United States into one compact body, thus creating a power the units of which, working with a harmony of purpose, will foster fraternal relations and intercourse among dentists; safeguard the material interests of the profession; elevate the standards and improve the methods of dental education; secure the enactment and enforcement of just dental laws, while aiming at a unification of state dental statutes, and enlighten and direct public opinion in relation to oral hygiene, dental prophylaxis, and advanced scientific dental service.

Article III—*Membership.*

The membership of this association shall consist of the present members, and such members of the constituent societies, and such members of the army dental corps, and of the navy dental corps, and such others as shall be elected in accordance with the By-laws, as hereinafter provided.

Article IV—*Constituent Societies.*

Section 1. State and territorial societies which have, or which hereafter may, become organized in conformity with the general plan of the National Dental Association, and which have declared their allegiance to said National Dental Association, and which shall agree to the formation and perpetuation of the house of Delegates, shall be recognized as constituent societies.

Sec. 2. The term "state society" shall be understood to mean the representative dental organization of any one of the states which have been received into the Union, and whose active membership is restricted to legal practitioners practicing within the legal borders of such state. The term "territorial society" shall apply in similar manner to the representative dental organization of any of the territorial possessions of the United States. Provided, however, that the term "territorial society" shall be held to include the societies of the District of Columbia, of the Canal zone, and of the insular possessions of the United States.

Article V—*The House of Delegates.*

Section 1. There shall be a business body known as the house of Delegates of the National Dental Association. It shall consist of delegates elected by the constituent societies, and by the other dental bodies named in Section 2 of this article. The house of Delegates shall represent the delegated powers of the members of the National Dental Association, and shall be the national representative body of the constitutent societies. It shall elect the general officers of the association and a board of nine trustees, and shall

transact all the business of the association, public, professional, or scientific, not otberwise provided for. The trustees shall be members of the house of Delegates, without the right to vote.

SEC. 2. The total voting membership in the house of Delegates (exclusive of the Board of Trustees) shall be as follows: One delegate shall be allowed from each scientific section, from the army dental corps, from the navy dental corps, and one from each constituent society. Each constituent society shall be entitled to one additional delegate if one hundred of its members become regularly enrolled as members of the National Dental Association; and one more delegate for each additional two hundred members enrolled.

Explanatory.—Regardless of enrollment in the National Dental Association each constituent society would have 1 delegate;—

100	members	in	the	National,	2	delegates.
300	"	"	"	"	3	"
500	"	"	"	"	4	"
700	"	"	"	"	5	"
900	"	"	"	"	6	"
1100	"	"	"	"	7	"
1300	"	"	"	"	8	"
1500	"	"	"	"	9	"

In case any states do not affiliate, all members of the National Dental Association residing in such states may meet together at the first meeting of any session of this association, and elect one delegate to represent them in the house of Delegates.

ARTICLE VI—*Sections.*

SECTION 1. This association shall be divided into three sections, as follows:

Section I shall have charge of operative dentistry, nomenclature, literature, dental education, and allied subjects.

Section II shall have charge of oral surgery, anatomy, physiology, histology, pathology, etiology, prophylaxis, oral hygiene, materia medica, and allied subjects.

Section III shall have charge of prosthodontia, orthodontia, metallurgy, chemistry, and allied subjects.

SEC. 2. New sections may be created, or existing sections discontinued or modified, by the house of Delegates.

ARTICLE VII—*Branches.*

In addition to the existing Southern Branch, the house of Delegates may create such branch organizations as may be deemed essential to the welfare of the National Dental Association and of the dental profession.

ARTICLE VIII—*Annual Sessions.*

The National Dental Association shall hold an annual session at the time and place chosen by the house of Delegates. The time and place for the session, however, may be changed by the unanimous vote of the Board of Trustees, but not later than sixty days prior to the time selected for the session.

ARTICLE IX—*Officers.*

SECTION 1. The general officers of the association shall be a president, three vice-presidents, a general secretary, and a treasurer.

SEC. 2. These officers shall be elected annually by the house of Delegates, to serve for one year, or until their successors shall have been elected and installed.

SEC. 3. No member of the house of Delegates shall be eligible to the office of president or vice-president.

ARTICLE X—*Board of Trustees.*

SECTION 1. The Board of Trustees shall have charge of the property and of the financial affairs of the association.

SEC. 2. Three trustees shall be elected annually by the house of Delegates, each to serve for a period of three years.

SEC. 3. No voting member of the house of Delegates shall be eligible to election on the Board of Trustees, but the Board of Trustees after election shall be members of the house of Delegates, without the right to vote.

SEC. 4. No member who has served one full term as a member of the Board of Trustees, shall be eligible for re-election on the board until a period of three years has elapsed, provided that this does not apply to *ex officio* members of the board.

(*Resolved,* That the present Council shall be members of the first Board of Trustees, and shall serve out their present terms, and they shall also be eligible for re-election for one full term of three years.)

ARTICLE XI—*Dues and Assessments.*

SECTION 1. The annual dues in this association shall be one dollar.

SEC. 2. Members of the army and navy dental corps may be elected to full membership, with all privileges, on payment of the annual dues.

Sec. 3. All members of the National Dental Association in good standing shall receive the Journal free. To members of state dental societies not enrolled in the National Dental Association the subscription to the Journal shall be two dollars; and to all others the subscription shall be three dollars; provided that if this should be in conflict with the rules of the United States postal authorities the Board of Trustees may reduce the general subscription to two dollars.

Sec. 4. In case of need, in order to raise funds, the house of Delegates may order an assessment not to exceed two dollars in one year, for each member; or an assessment not to exceed fifty dollars in one year upon each constituent society, but not both.

Article XII—*Amendments.*

The house of Delegates may amend or alter this Constitution at any annual session, due notice having been given at a previous meeting of said annual session, provided unanimous consent may be obtained. Otherwise all amendments must lie on the table until the annual session next following their introduction, at which time a two-thirds vote will be requisite for their adoption. In the latter procedure due notice of the substance, or if not too lengthy the exact wording, of the proposed changes must be sent to each member of the house of Delegates with the regular notice of the annual session.

BY-LAWS.

BOOK I: MEMBERSHIP.

Chapter I—*Qualification for Active Membership.*

Section 1. A member in good standing of a constituent society shall be eligible for membership in the National Dental Association on presentation to the general secretary of the following: (1) Satisfactory evidence; (2) written application for membership on the prescribed form; (3) the annual dues.

Sec. 2. Members of the army and navy dental corps may become members in like manner, upon presenting satisfactory evidence of membership in said corps.

Sec. 3. Members must retain their membership in constituent societies. Upon official notification from a constituent society that a member has lost this qualification, the general secretary will erase the delinquent's name from the roll of membership of this association, and notify him of this action, stating the reason therefor.

Sec. 4. Any member who has forfeited his membership in accordance with Section 3 shall be reinstated on his request by the general secretary, on presentation of satisfactory evidence that his qualification has been restored by the constituent society.

Sec. 5. Any member who shall fail to pay his annual dues for one year, unless absent from the country, shall be dropped from the roll of members, provided that due notice shall be previously given to the member by the general secretary. Any member who has been suspended for non-payment of dues shall be restored only when all his dues have been paid.

Sec. 6. A member who becomes a resident of another state to retain his membership in the National Dental Association must become a member of the constituent society in the state to which he has removed.

Chapter II—*Registration.*

Section 1. No member shall take part in the proceedings of the association or of any of the sections until he has registered his name and address with the proper officer or committee and has paid his annual dues for the current year.

Sec. 2. A member desiring to take part in the scientific work of the association shall indicate, when registering, the section in which he wishes to be enrolled.

Chapter III—*Delegated Members, Honorary Members, Associate Members, etc.*

Section 1. Members delegated to the house of Delegates shall register and pay their annual dues, thus qualifying as members of this association, before taking their seats in the house of Delegates.

Sec. 2. Dentists who have risen to preeminence in foreign countries shall be eligible to honorary membership. They may be elected by the house of Delegates on nomination by a section, but not more than three honorary members shall be elected in any one year.

Sec. 3. Associate membership may be granted by the house of Delegates to distinguished visitors. Such membership accords all privileges for one year, including the Journal of the association.

Sec. 4. Membership of all classes may be declared forfeited by the house of Delegates for reasons considered sufficient by that body.

BOOK II: DELEGATES.

CHAPTER IV—*Qualifications, Terms, Apportionment and Registration of Delegates and Alternates.*

SECTION 1. No one shall serve as a member of the house of Delegates who is not a member of this association.

SEC. 2. Delegates and alternates from the scientific sections and from the army and navy dental corps shall be elected for one year. Delegates and alternates from constituent societies shall be elected for two years. Constituent societies entitled to more than one delegate shall elect them so that one-half, as near as may be, shall be elected each year.

SEC. 3. Beginning with the annual session of 1913, the house of Delegates shall be constituted as described in Article V of Section 2 of the Constitution. The number of delegates to which each constituent society may be entitled shall be based on the number of members from whom dues for the current year shall have been received by the general secretary of this association at least thirty days prior to the first day of the annual session of this association.

SEC. 4. In the cases of those constituent societies which do not hold meetings of the current year at least forty-five days prior to the annual session of this association the number of delegates shall be estimated on the dues for the previous year received by the general secretary of this association.

SEC. 5. To be represented in the house of Delegates the officers of each constituent society shall file with the general secretary of this association, at least thirty days prior to the first day of the annual session, a list of the names of its delegates and alternates.

SEC. 6. Previous to the annual session the general secretary of this association shall prepare and have printed a list of the delegates and alternates elected by the various constituent societies; also the number of paid members of each. In case any society has elected more delegates than the number to which its paid membership shows it to be entitled, the general secretary in preparing the list shall drop one or more names from the list of such society, beginning at the bottom of the list, until the proper number of names remain.

SEC. 7. At any election of delegates, the body electing may at the same time elect as many alternates as delegates, and the alternate of each delegate may sit in his stead in the house of Delegates in the absence of the regular delegate from any annual session, except as provided in Section 9 of this chapter.

SEC. 8. Every delegate must present his credentials and be duly registered by the general secretary, or other designated officer or committee, before taking part in the business of the house of Delegates. Credentials shall include a certificate duly signed by the proper officials of the body delegating him, and such other evidence as may be required.

SEC. 9. The credentials of a delegate having been accepted and his name placed on the roll of the house of Delegates, he shall remain the duly accredited delegate of the body which he represents until final adjournment of the session, and his place shall not be taken by any other delegate or alternate.

CHAPTER V—*Procedure of House of Delegates.*

SECTION 1—*Order of business.* The following shall be the order of business unless changed by unanimous consent:

1. Call to order by the president.
2. Roll-call.
3. Reading and adoption of minutes.
4. Reports of officers.
5. Reports of committees.
6. Unfinished business.
7. New business.

SEC. 2. No new business shall be introduced into the house of Delegates on the last day of the annual session unless with unanimous consent; and such new business, whether in the form of a resolution, memorial or otherwise, shall require a unanimous vote for final action.

SEC. 3. The house of Delegates shall be governed by Roberts' Rules of Order, when not in conflict with these By-laws or with the rules of the house.

SEC. 4. One-fifth of the voting members of the house of Delegates shall constitute a quorum.

CHAPTER VI—*Meetings of the House of Delegates.*

SECTION 1. The house of Delegates shall meet annually on the day preceding the opening of, and at the same place as, the annual session of the association.

SEC. 2. Special sessions of the house of Delegates shall be called by the president, on written request of a sufficient number of delegates to represent a majority of the con-

stituent societies, by mailing a written or printed notice to the last known address of each delegate, at least twenty days before such special session is to be held, in which shall be specified the time and place of meeting and in general terms the objects of such special session, and no other business shall be transacted thereat. The time and place for the meeting of a special session must be given in the requests signed by the delegates.

CHAPTER VII—*Nomination, Election, and Installation of Officers, Trustees, Honorary Members, Associate Members, etc.*

SECTION 1. Nominations for office, except that of treasurer, shall be made orally, but no nominating speech shall exceed two minutes in length. Any nominee receiving the majority of the votes cast shall be declared elected. The treasurer shall be nominated by the Board of Trustees, who shall present two names.

SEC. 2. All elections shall be by ballot, and a majority of the votes cast shall be necessary to elect. In case no nominee receives a majority of the votes on the first ballot the nominee receiving the least number of votes shall be dropped, and a new ballot held. This procedure shall be continued until one of the nominees receives a majority of all votes cast, when he shall be declared elected.

SEC. 3. The election of officers shall be the first order of business of the house of Delegates after the reading of the minutes on the afternoon of the third day of the annual session.

SEC. 4. Nominations for honorary membership from the sections shall be referred without debate to the Committee on Sections and Section Work, which shall consider the relative scientific attainments and professional character of the nominees, and shall report its conclusions to the house of Delegates for action. The election of honorary members shall immediately follow the election of officers.

SEC. 5. Nominations for associate membership may be made by the sections at any meeting of the house of Delegates, and may be confirmed, with or without reference to the Committee on Sections and Section Work, at the will of the majority of the house of Delegates.

SEC. 6. The general officers of the association shall be installed at the close of the last meeting of the annual session at which they are elected.

BOOK III.

CHAPTER VIII—*Officers, Trustees, and Committees.*

SECTION 1—*President.* The president shall preside at the general meeting and at the meetings of the house of Delegates, and shall perform such duties as custom and parliamentary usage require. On the morning of the first day of the annual session following his election he shall deliver an address at the general meeting not exceeding forty minutes in length.

SEC. 2 — *Vice-presidents.* The vice-presidents shall assist the president. During his absence or at his request one of them shall officiate in his place. In case of the death, resignation, or removal of the president, the vacancy shall be filled by the ranking vice-president.

SEC. 3—*General secretary.* The general secretary shall give due notice of the time and place of all annual and special sessions of the association and of the house of Delegates, by publishing the same in the Journal of the National Dental Association and other journals. He shall notify members of committees of their appointment, and of the duties assigned to them. It shall be his duty to verify the credentials of members of the house of Delegates and to provide a registration book for them, in which shall be recorded the name of each delegate in attendance at each session. He shall collect all dues and transmit the same to the treasurer, as may be directed by the Board of Trustees, and as receipt for dues shall issue certificates of membership. He shall conduct all correspondence required of him by the association or by the house of Delegates, or which may become necessary in the rightful conduct of his office. He shall keep in separate books the minutes of the general meetings and of the house of Delegates. He shall prepare a roll of the delegates attending each session to facilitate voting by roll-call. He shall prepare for publication the official program of each session, and shall perform such other duties as may be directed by the association or by the house of Delegates, and shall receive a salary to be fixed by the Board of Trustees.

SEC. 4—*Treasurer.* The treasurer shall be the custodian of all moneys, securities and deeds belonging to the association, and shall hold the same, subject to the direction of the Board of Trustees. He shall give to the Board of Trustees a suitable bond, and shall receive a salary to be fixed by the Board of Trustees.

CHAPTER IX—*Board of Trustees.*

SECTION 1. The Board of Trustees shall have charge of all properties and of the financial affairs of the association. At the first meeting of the board after the annual session of the association it shall organize. In addition to the nine elected members of the Board of Trustees, the president and general secretary shall be *ex officio* members and shall hold the same positions in the board as in the association, but the board shall elect a recording secretary, who shall keep its records and make its reports.

SEC. 2—*Journal.* It shall be the duty of the Board of Trustees to provide for and superintend the publication of the Journal of the National Dental Association, and of all proceedings, transactions, and memoirs of the association. It shall have full discretionary power to omit from the Journal of the National Dental Association, in part or in whole, any paper that may be referred to it by any of the sections. It shall appoint a general manager and editor of the Journal, which two positions may be held by one person, and such assistants as may be necessary, and shall determine the terms and conditions of their employment.

SEC. 3—*Meetings during annual sessions.* During the annual session of the association the board shall hold meetings as often as may be deemed necessary by the president, and all matters referred to it by the house of Delegates shall be reported on within twenty-four hours, if so ordered by the house.

SEC. 4—*Board reports.* The Board of Trustees shall have the accounts of the treasurer and of the Journal office audited annually, or oftener if deemed necessary, and shall make an annual report on the same to the house of Delegates, which report shall also specify the character and cost of all the publications of the association during the year and the amount of all property belonging to the association.

SEC. 5—*Vacancies.* In case of vacancy in the office of treasurer or board secretary, the vacancy shall be filled by the Board of Trustees.

SEC. 6—*Salaries.* The Board of Trustees shall fix the salaries of the general secretary, the treasurer, the board secretary, and of the Journal manager and the editor.

SEC. 7—*Regular meetings of board.* Regular meetings of the Board of Trustees shall be held immediately after the annual session of the association and at the same place, and on the first Monday in the month of February, of each year, at such place as the board may select at its first meeting.

SEC. 8—*Special meetings of board.* Special meetings of the Board of Trustees may be called at any time by the president, or by request of five members of the board, due notice of which must be given to each member of the board at least five days in advance of the meeting. The general object of a special meeting must be stated in the notice, and no other business may be transacted.

SEC. 9—*Annual sessions, exhibits, clinics, and general arrangements.* The Board of Trustees shall have full control of all arrangements for the annual sessions, and shall provide meeting-places for the association, the house of Delegates and the various sections. It shall also have control of all clinics and of all exhibits. The Board of Trustees in their discretion may appoint a local committee of arrangements, which shall at all times be under the control of the Board of Trustees.

CHAPTER X—*Committees.*

SECTION 1. Committees shall be classified as (a) standing committees, (b) reference committees, (c) special committees. These committees shall be nominated by the president and elected by the house of Delegates, unless otherwise provided.

SEC. 2—*Committees, appointment and powers.* Reference committees shall be nominated from among the house of Delegates, but any member of the association shall be eligible to serve on standing or special committees. All members of committees who are not members of the house of Delegates shall have the right to present their reports in person to the house of Delegates, and to participate in the debate thereon, but shall not have the right to vote.

SEC. 3—*Standing committees.* Standing committees shall be as follows:

(a) A Judicial Council.
(b) A Committee on Dental Education.
(c) A Committee on Dental Legislation.
(d) A Committee on Transportation and Place of Session.

SEC. 4—*Judicial Council.* The Judicial Council shall be composed of five members, to be appointed by the president on the first day of each annual session from the delegates present, and to continue in office until their successors are appointed. It shall organize by electing a chairman and a secretary. The latter shall keep a permanent record of its

proceedings, shall conduct all correspondence, etc. The Judicial Council shall hold such meetings during the annual session, and during the year, as it may deem necessary. Three members shall constitute a quorum. It shall make an annual report of its proceedings to the house of Delegates. To this council shall be referred all questions, complaints, protests, and matters of an ethical nature. When such complaints, protests, etc., concern an individual's relations with his local or state society, they shall be considered by this council only after the same shall have been referred to the constituent society concerned, or on an appeal from such constituent society. Its decisions shall be subject to appeal to the house of Delegates.

SEC. 5—*Committee on Dental Education.* The Committee on Dental Education shall consist of five members. One member shall be elected to serve one year, one for two years, one for three years, one for four years, and one for five years. Thereafter one member shall be elected each year to serve five years. The committee shall organize, shall elect a chairman and secretary, and shall adopt such regulations for the government of its actions as it may deem expedient. It shall expend money or contract financial obligations only as shall be authorized in writing by the Board of Trustees. The functions of the Committee on Dental Education shall be: (1) To make an annual report to the house of Delegates on the existing conditions of dental education in the United States. (2) To make suggestions as to the means and methods by which the National Dental Association may best influence favorably dental education. (3) To act as the agent of the National Dental Association under instructions of the house of Delegates, in its efforts to elevate the standards of dental education.

SEC. 6—*Committee on Dental Legislation.* The Committee on Dental Legislation shall consist of five members. One member shall be elected for one year, one for two years, one for three years, one for four years, and one for five years. Thereafter one member shall be elected each year to serve for five years. The committee shall organize, shall elect a chairman and secretary, and shall adopt such regulations for the government of its actions as it may deem expedient. It shall expend money or contract financial obligations only as shall be authorized in writing by the Board of Trustees. This committee shall have the authority to appoint a subcommittee, consisting of one member from each constituent society, and shall have the power to co-operate with the officers of the state and local societies, and with the chief officers of the United States army and navy in regard to legislation affecting the welfare of dentistry. The Committee on Dental Legislation shall report to the house of Delegates at each annual session its proceedings during the previous year, and shall recommend such action in respect to pending legislation as it shall deem proper.

SEC. 7—*Committee on Transportation and Place of Sessions.* The Committee on Transportation and Place of Sessions shall consist of five members. The chairman shall be elected to serve for three years; the other four members shall be appointed by the president annually, one of whom shall reside in the place chosen for the next annual session. Invitation for the association to convene in any city or place shall be presented to this committee, whose duty it shall be to recommend to the house of Delegates the places available for an annual session, with advantages and disadvantages of each. The committee shall secure railroad rates for the annual session, and shall publish same in the Journal of the National Dental Association, and other journals, at the earliest possible time prior to the date of the annual session.

SEC. 8—*Reports of standing committees.* The reports of standing committees shall, as far as possible, be transmitted to the general secretary ten days before the date of the annual session, and he shall have them printed for distribution to members of the house of Delegates at the first meeting of the annual session.

SEC. 9—*Reference committees.* (a) Immediately after the organization of the house of Delegates, at each annual session, the president shall appoint from among its members such committees as may be deemed expedient by the house of Delegates. Each committee shall consist of three members unless otherwise provided, the chairman to be specified by the president. The members of these committees shall serve during the session at which they are appointed.

(b) To the appropriate committee shall be referred resolutions, measures, and propositions presented to the house of Delegates before final action shall be taken, unless otherwise unanimously ordered by the house of Delegates.

(c) Each reference committee shall, as soon as possible after the adjournment of each meeting, or during the meeting, if necessary, take up and consider such business as

may have been referred to it, and shall report on the same at the next meeting, or when called on to do so.

(d) The following reference committees are hereby provided:

1. A Committee on Sections and Section Work, to which shall be referred all business relating to the sections.

2. A Committee on Rules and Order of Business, to which shall be referred all matters regarding rules governing the action, methods of procedure and order of business of the house of Delegates.

3. A Committee on Dental Education, to which shall be referred all matters relating to dental colleges and dental education. The members of the standing Committee on Dental Education shall be *ex officio* members of this reference committee.

4. A Committee on Legislation, to which shall be referred all matters relating to state and national legislation. The members of the standing Committee on Dental Legislation shall be *ex officio* members of this reference committee.

5. A Committee on Amendments to the Constitution and By-laws, to which shall be referred all business relating to this subject.

6. A Committee on Reports of Officers, to which shall be referred the president's address and the secretary's and trustees' reports.

7. A Committee on Credentials, to which shall be referred all questions regarding the registration and the credentials of delegates.

8. A Committee on Miscellaneous Business, to which shall be referred all business not otherwise disposed of.

BOOK IV.

CHAPTER XI—*General Meetings.*

SECTION 1—*Time of general meetings.* The general meetings shall be held at 10.30 A.M. and at 8 P.M. of the first day of the annual session, and at 8 P.M. of the subsequent days.

SEC. 2—*Addresses.* At the first general meeting shall be delivered the address of the president, whose recommendations shall thereupon go to the house of Delegates for action. The balance of the time of the first meeting shall be devoted to such other addresses as may be provided. The first evening meeting shall be devoted to a paper recommended by Section I, the second evening meeting to a paper recommended by Section II, and the third evening meeting to a paper recommended by Section III.

SEC. 3—*Order of business.* The order of the first general meeting shall be as follows:

1. Calling the meeting to order.
2. Prayer.
3. Address of welcome and response.
4. Report of Committee of Arrangements.
5. President's annual address.
6. Discussion of president's address.
7. Literary program.
8. Adjournment.

CHAPTER XII—*Sections.*

SECTION 1—*Meetings.* Each section shall hold its first meeting at 2 P.M. of the first day of the annual session, and on each subsequent day at 9 A.M., until the program is completed or as the section may decide; provided that a section shall hold no meeting that will conflict with a general meeting.

SEC. 2—*Officers of sections.* The officers of each section shall consist of a chairman, vice-chairman, and a secretary. These shall serve for one year, or until their successors are elected and qualify; provided that each section may elect its secretary to serve a longer time at its discretion. Each section shall also elect annually one representative and an alternate to the house of Delegates of the National Dental Association, to serve for one year.

SEC. 3—*Election of officers.* The election of officers of each section shall be the first order of business of the morning meeting of the last day of each annual session.

SEC. 4—*Duties of section officers.* (a) Each chairman shall perform the usual duties of such office, and shall co-operate with the section secretary, in procuring papers and in the arrangement of the program for his section. (b) Each vice-chairman shall assist his chairman, and take his place when necessary. (c) Each secretary shall keep the records of the section in a book provided for such purpose; shall, with the co-operation of the chairman, conduct all correspondence necessary to secure papers and perfect the program for his section; and he shall forward to the general secretary, at least forty days prior to the date of the annual session, a copy of his section program for insertion in the official program, and shall perform all other duties pertaining to the office of secretary.

SEC. 5—*Executive Committee.* Each section shall have an Executive Committee, which shall consist of the last three retired chairmen. In the absence of a member of this committee the acting chairman shall sit in his stead. At the first organization of each section, in 1913, an Executive Committee of three shall be elected, one to serve for one

year, one for two years, and one for three years, by which time the Executive Committee will be constituted as above provided. The Executive Committee shall examine and pass on all papers read before the section, and shall indorse for publication only those that are of scientific or of practical value; it shall also examine all papers offered to the section prior to the reading thereof, and shall choose the one to be read before the general meeting devoted to the work of its particular section, and such paper shall not be read before the section meeting.

SEC. 6—*Honorary and Associate members.* Each section, at its opening meeting, may make nominations for honorary and for associate members, in accordance with Sections 2 and 3 of Chapter III. The secretary shall immediately notify the general secretary of such nominations.

CHAPTER XIII—*Papers and Discussions.*

SECTION 1. Titles and abstracts of papers offered to sections must be in the hands of the section secretary at least forty-five days prior to the annual session.

SEC. 2. The time allowed for the presentation of a paper before a section shall be limited to thirty minutes, except by unanimous consent. No one shall address a section more than once on the same subject, nor for longer than five minutes, except with the consent of the majority of those present.

SEC. 3. Each section may provide by-laws for its own government, provided these by-laws do not conflict with the Constitution and By-laws of the association.

CHAPTER XIV—*Publication.*

SECTION 1. No paper shall be published as having been read before a section unless it has received the approval of the Executive Committee of said section.

SEC. 2. Each author shall hand his manuscript to the section secretary immediately after the reading thereof, and such manuscript must be ready for publication at that time, and must be accompanied by copy for all illustrations needed. The secretary shall indorse thereon that it has been read, and shall hand it to the Executive Committee for its action. All papers approved by the Executive Committee shall be returned to the section secretary, who shall at once forward them for publication to the editor of the Journal.

SEC. 3. No paper shall be published as having been read before a section unless it has actually been read, or unless, for special reasons, when the author has been present and prepared to read the paper, the section shall vote to have it read by title.

SEC. 4. All papers and reports presented to a section, and approved by the Executive Committee, shall become the exclusive property of the association, provided that the Board of Trustees may permit an author to publish his paper elsewhere than in the Journal of the National Dental Association.

SEC. 5—*Official resolutions approved by the house of Delegates.* No memorial, resolution, or opinion of any character whatever shall be issued in the name of the National Dental Association, unless it shall have been approved by the house of Delegates.

BOOK V—AMENDMENTS.

CHAPTER XV—*Articles of Incorporation.*

SECTION 1. The house of Delegates at any annual session, wherever the same may be held, may instruct the Board of Trustees to make any changes in the articles of incorporation in accordance with the law, which may appear desirable, or which may be made necessary by any change or amendment to the Constitution and By-laws of this association.

SEC. 2. These By-laws may be amended on a two-thirds vote of the house of Delegates, provided that no amendment shall be acted on till the day following that on which it is introduced; except that the Board of Trustees may by unanimous vote make such changes, and such changes only, as may be required to adapt them to the rules and regulations of the United States postal authorities.

ORDER OF BUSINESS.

FIRST DAY.

8 A.M.—Meeting of the Executive Committee.

8 A.M.—Meeting of the Program Committee.

9 A.M.—Meeting of the Executive Council.

10 A.M.—Meeting in general session.
- Report of Executive Council.
- Report on Program for next general session, and for each section for next 24 hours.
- President's Address.

1 P.M.—Adjournment of general session, unless sooner adjourned.

2.30 P.M.—Meetings of sections for literary and scientific work.

8 P.M.—Meetings of sections for literary and scientific work.

SECOND DAY.

9 A.M.—Meetings of sections for literary and scientific work.

12 NOON—Meeting in general session.
- Reading of Minutes.
- Report of Executive Council.
- Report on Program.
- Address, or Reports.

2.30 P.M.—Meetings of sections for literary and scientific work.

8 P.M.—Meetings of sections for literary and scientific work.

THIRD DAY

9 A.M.—Meetings of sections for literary and scientific work.

12 NOON—Meeting in general session.
- Reading of Minutes.
- Report of Executive Council.
- Report on Program.
- Selection of next place of meeting.
- Election of Officers.

1.30 P.M.—Adjournment, if not adjourned earlier.

2.30 P.M.—Meetings of sections for literary and scientific work.

8 P.M.—Meetings of sections for literary and scientific work.

FOURTH DAY.

9 A.M.—Meetings of sections for literary and scientific work.

12 NOON—Meeting in general session.
- Reading of Minutes.
- Report of Executive Council.
- Address, or Reports.
- Installation of Officers.
- Appointment of Committees.
- Final Reading of Minutes.
- Adjournment of the Annual Session.

AMENDMENTS.

The Constitution, Rules of Order and Order of Business of this Association may be altered or amended at any annual session by unanimous consent of the members present providing notice has been given in writing at a previous meeting of the annual session at which the amendment is proposed; or by a vote of two-thirds of the members present, providing notice of the alteration or amendment has been given in writing at a previous annual session.

STANDING RESOLUTIONS.

The following standing resolutions are in force at this time:

1. Resolved, That a paper presented to the Committee on Voluntary Essays, and by them considered and returned to the writer with notification that the said paper is not accepted, cannot afterward be read before the Association unless it is made the special order by resolution adopted.

2. Resolved, That this Association discountenances the giving of banquets, excursions, entertainments, etc., by local professional societies or individuals, either during or at the close of our annual meetings.

3. Resolved, That it is unprofessional to use on cards or signs anything except name, title, and address.

4. Resolved, That this Association directs that sections belonging thereto shall be prohibited from inviting individuals who are violating the Code of Ethics to hold clinics or to give other exhibitions before this body.

5. Resolved, That a standing committee of three be appointed, to be known as the Committee on Terminology, whose duty it shall be to prepare and submit a carefully prepared report at each annual meeting of this Association.

6. Resolved, That this Association believes the conferring of honorary degrees in dentistry to be detrimental to the profession of dentistry, and hereby expresses its disapprobation of the practice.

7. Resolved, That a committee of three be appointed by the chair to co-operate with the officers in charge of the Army Medical Museum and Library in enriching its store of dental literature and specimens, especially by appealing to dental societies and individual members of the dental profession for assistance.

8. Resolved, That the National Dental Association condemns the use of secret preparations known as "local anesthetics," as well as all other secret preparations.

9. Resolved, That the secretary or other officer of each society sending delegates to this Association is expected to make a general report of the work done by the society he represents during the year, giving the subjects of the papers read before them and digests of the same, and to send said reports to the Secretary of this Association at least three weeks before the date of each annual meeting; the reports to be forwarded to the chairman of the section to which they belong.

10. Resolved, That any member of the dental profession who has been in reputable practice for a period of fifty years may be elected to permanent membership in the Association without payment of dues, and any member of this Association who has been in practice for a like period shall have his dues remitted thereafter by presenting the fact to the Treasurer of the Association.

11. Resolved, That lists of the ex-presidents of the American Dental Association and of the Southern Dental Association shall be published annually in the Transactions of the National Dental Association, and that all members and officers hold the same relations to the National Dental Association that they did to the former associations.

RULES OF ORDER.

1. On the arrival of the hour of meeting, the President shall take the chair, call to order, and announce that the meeting is open for business.

2. No motion or speech shall be in order until the mover or speaker shall have been recognized and assigned the floor by the chair, nor shall a motion be open for debate until seconded and stated by the chair.

3. No one shall be permitted to address the Association before giving his name and residence, which shall be distinctly announced from the chair; nor shall he speak more than twice, nor longer than fifteen minutes in all, unless by consent of the Association.

4. At the request of any member a motion shall be put in writing.

5. At the request of five members a question shall be divided or the yeas and nays ordered.

6. When a question is under debate no other motion shall be in order, except—1st, to adjourn; 2d, to lay on the table; 3d, the previous question; 4th, to postpone; 5th, to commit; 6th, to amend—and these motions shall take precedence in the order here stated.

7. The previous question and the motions to adjourn, to lay on the table, and to postpone, shall be decided without debate.

8. A motion to adjourn shall always be in order, but no member can make such a motion while another is speaking or while a vote or ballot is being taken.

9. A second amendment to the main question shall not be in order until the first is disposed of, nor shall there be an amendment of an amendment to an amendment.

10. After a motion has been seconded and stated by the chair, it shall not be withdrawn without the consent of the Association.

11. No member shall interrupt another while speaking, except to raise a point of order.

12. When called to order, a member shall sit down until the point of order is decided by the chair, or in case of appeal, by the Association. If the point of order be sustained, the member can proceed in order by the consent of the Association.

13. Every member shall vote upon a question unless excused by the Association.

14. When any motion, except to adjourn, has been rejected, it shall not be renewed without unanimous consent.

15. Any member who on a question voted in the majority may move a reconsideration of that question; but if that motion shall be lost or laid upon the table, it shall not be renewed without unanimous consent.

16. The President may vote with the members upon all questions, but having so voted, shall not give the casting vote in case of a tie.

17. Motions for filling blanks shall be put in the order in which they are moved.

18. On a division, or in voting by yeas and nays, any member may change his vote before the result is declared.

19. These rules may be suspended by unanimous consent.

Code of Ethics.

ARTICLE I.

THE DUTIES OF THE PROFESSION TO THEIR PATIENTS.

SECTION 1. The dentist should be ever ready to respond to the wants of his patrons, and should fully recognize the obligations involved in the discharge of his duties toward them. As they are in most cases unable to correctly estimate the character of his operations, his own sense of right must guarantee faithfulness in their performance. His manner should be firm, yet kind and sympathizing, so as to gain the respect and confidence of his patients, and even the simplest case committed to his care should receive that attention which is due to operations performed on living, sensitive tissue.

SEC. 2. It is not to be expected that the patient will possess a very extended or a very accurate knowledge of professional matters. The dentist should make due allowance for this, patiently explaining many things which may seem quite clear to himself, thus endeavoring to educate the public mind so that it will properly appreciate the beneficent efforts of our profession. He should encourage no false hopes by promising success when, in the nature of the case, there is uncertainty.

SEC. 3. The dentist should be temperate in all things, keeping both mind and body in the best possible health, that his patients may have the benefit of that clearness of judgment and skill which is their right.

ARTICLE II.

MAINTAINING PROFESSIONAL CHARACTER.

SECTION 1. A member of the dental profession is bound to maintain its honor, and to labor earnestly to extend its sphere of usefulness. He should avoid everything in language and conduct calculated to dishonor his profession, and should ever manifest a due respect for his brethren. The young should show special respect to their seniors; the aged, special encouragement to their juniors.

SEC. 2. It is unprofessional to resort to public advertisement, cards, handbills, posters, or signs, calling attention to peculiar styles of work, lowness of prices, special modes of operating; or to claim superiority over neighboring practitioners; to publish reports of cases or certificates in the public prints, to circulate or recommend nostrums; or to perform any other similar acts. But nothing in this section shall be so construed as to imply that it is unprofessional for dentists to announce in the public prints, or by cards, simply their names, occupation, and place of business, or in the same manner to announce their removal, absence from, or return to business, or to issue to their patients appointment cards, having a fee bill for professional services thereon.

SEC. 3. When consulted by the patient of another practitioner the dentist should guard against inquiries or hints disparaging to the family dentist or calculated to weaken the patient's confidence in him; and if the interest of the patient will not be endangered thereby, the case should be temporarily treated, and referred back to the family dentist.

SEC. 4. When general rules shall have been adopted by members of the profession practicing in the same localities in relation to fees, it is unprofessional and dishonorable to depart from those rules, except when variation of circumstances requires it. And it is ever to be regarded as unprofessional to warrant operations as an inducement to patronage.

ARTICLE III.

CONSULTATIONS.

Consultations should be promoted in difficult or protracted cases, as they give rise to

confidence, energy, and broader views in practice. In consultations that courtesy and just dealing which is the right of all should be especially observed.

ARTICLE IV.

THE RELATIVE DUTIES OF DENTISTS AND PHYSICIANS.

Dental surgery is a specialty in medical science. Physicians and dentists should both bear this in mind. The dentist is professionally limited to diseases of the dental organs and adjacent parts. With these he should be more familiar than the general practitioner is expected to be; and while he recognizes the broader knowledge of the physician in regard to diseases of the general system, the latter is under equal obligations to respect his higher attainments in his specialty.

ARTICLE V.

THE MUTUAL DUTIES OF THE PROFESSION AND THE PUBLIC.

Dentists are frequent witnesses, and at the same time the best judges, of the impositions perpetrated by quacks, and it is their duty to enlighten and warn the public in regard to them. For this and many other benefits conferred by the competent and honorable dentist, the profession is entitled to the confidence and respect of the public, who should always discriminate in favor of the true man of science and integrity against the empiric and impostor. The public has no right to tax the time and talents of the profession in examinations, prescriptions, or in any way, without proper remuneration.